MINNESOTA MEDICINE

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[1] *J. Biol. Chem., 76:2.* [2] *Ibid., 66:451.*
[3] *Ibid., 80:15.* [4] *Ibid., 76:251.*

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XIII JANUARY, 1930 No. 1

THE ADVANCING KNOWLEDGE OF SPINAL ANESTHESIA

DANIEL H. BESSESEN, M.D.
Minneapolis

THE use of spinal anesthesia on the head, neck and thorax has been so entirely contrary to our former interpretation of the action of spinal anesthesia, that the established theories of the action of novocaine on the spinal and nerve tissues must be removed before it can be considered safe to administer this form of anesthesia on the higher regions of the body. The mere fact that the novocaine may be introduced into the spinal canal and in any one case produce general anesthesia without death is sufficient to demand explanation if we are to cling to older hypotheses.

It was formerly thought that respiratory and cardiac paralyses were responsible for deaths from this form of anesthesia. This, we now know, is not the case. Deaths which result from subarachnoid nerve blocks are due to cerebral anemia from fall in blood pressure and may be prevented by the Trendelenburg position. Even if no fluids are injected to bring the blood pressure back to normal, the pressure is found to rise again on change of position in those few cases (5 per cent) in which it falls to dangerous levels to within ten or twenty millimeters of the former level measured before the introduction of anesthesia.

To properly explain this action, let us review the studies made on the effect of novocaine on sensory and motor nerves. These indicate that motor nerves are not affected by novocaine in the dilution required to deaden sensory nerves. It is true that sensory stimuli aid in maintaining circulation and respiration, but there is sufficient automaticity in these functions to keep them operating in the absence of sensory stimuli. The distribution of novocaine over the sensory nerves of the entire head, neck and thorax may put the and respiration, if the blood pressure is high patient to sleep but will maintain the circulation enough to nourish the upper nerve centers.

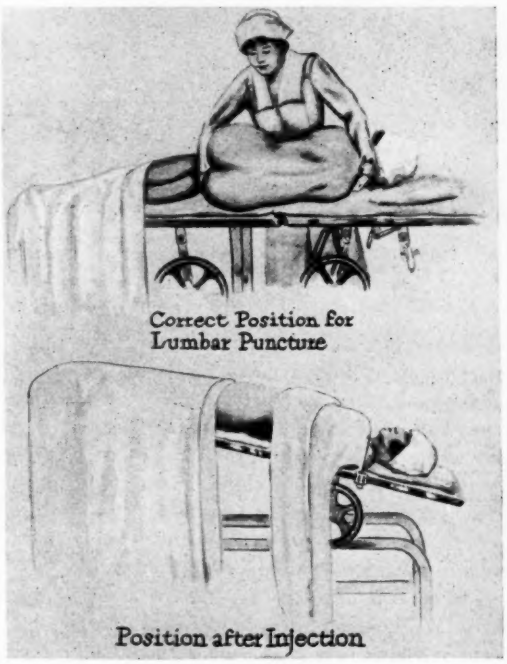

Fig. 1. The position illustrated in the upper drawing is that permitting the greatest ease in performing lumbar puncture. After withdrawing spinal fluid and reinjecting the anesthetic, the patient is placed in the position illustrated in the lower drawing.

When one adds to these physiologic explanations, the anatomic fact that the ligamentum denticulatum divides the posterior (sensory) portion of the spinal canal from the anterior

(motor) portion and that it is into the posterior (sensory) portion that the novocain is injected, it becomes more comprehensible how spinal anesthesia may be applied to the upper portions of the body without danger of death.

The diaphragm is no longer accepted as the upper level of safe spinal anesthesia. The blood pressure is no longer taken as the index of the safety margin of the patient. We are coming more and more to rely on Labat's statement that the safety of spinal anesthesia rests on the Trendelenburg position alone, has nothing to do with the distribution of the novocaine in the nerve centers and need not require more than passing attention to the blood pressure.

The contraindications for the use of this anesthetic are being limited to cerebral disease, infections which may contaminate the spinal puncture and conditions prohibiting the use of Trendelenburg position.

While this advancing work and these changing interpretations broaden the scope of spinal anesthesia and make more comprehensible its application to all fields of the body, we must remember that the use of these methods requires expert care and attention. We must learn to accept these changes in physiologic knowledge and realize that in this way we are approaching a standardization of novocaine nerve block more nearly ideal. There still remain the numerous advantages of spinal anesthesia, but we must not be fanatic in its application to all cases regardless of circumstances—because we must bear in mind that the patient comes to us to get well. Therefore, the best technic and the proper methods suitable to that particular case are the ones to select for administration.

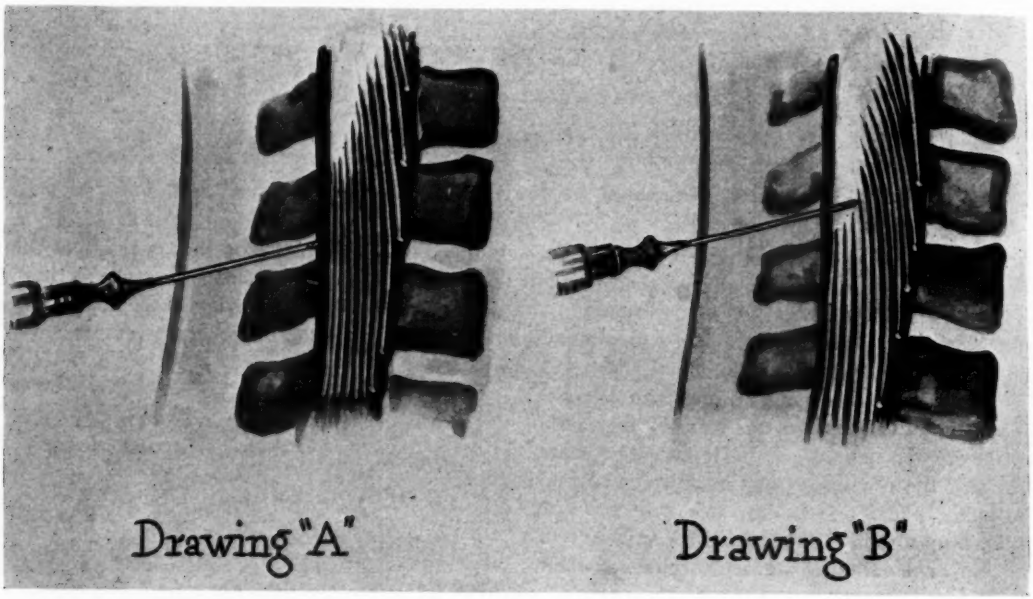

Fig. 2. In drawing "A" is shown the commonest error in technic—the needle is half in and half out of the dura. The spinal fluid will flow out, but the anesthetic will not usually pass into the dural canal.
Drawing "B" illustrates the better placement of the needle, well into the spinal canal. Properly, the bevel of the needle should be within the dura, posterior to the ligamentum denticulatum, thus allowing the novocaine to come in direct contact with the sensory nerve roots.

The technic of spinal anesthesia is departing from stock solutions and from solutions of lighter or heavier specific gravity than the spinal fluid. The best procedure is that described by Evans—the dissolving and reinjecting of one to two and a half decigrams of novocaine in four to eight cubic centimeters of spinal fluid into the spinal canal. The amount of drug and the volume of spinal fluid determine the level of anesthesia. With the larger dosages, the level will rise higher and the length of anesthesia be slightly longer; with larger volume, a wider distribution will be obtained.

The duration of anesthesia still remains at

approximately 60-90 minutes and is suitable for most operations of that expected length of time. The relaxation of muscles and relative bloodlessness of the field make the operative technic much more rapid than under any other form of anesthesia.

These advances in our present knowledge of spinal anesthesia are being heralded with enthusiasm by many of the outstanding surgeons of the world. We can only stand in awe at the marvels of nature as applied to surgical maneuvers.

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DR. FLORENCE RENA SABIN WINS AWARD

To that large and constantly increasing number of women seeking professional careers, the announcement by Pictorial Review that the winner of its annual Achievement Award of $5,000 for the year 1928 is Dr. Florence Rena Sabin, fellow of Johns Hopkins University, and member of the staff of the Rockefeller Institute for Medical Research, will prove encouraging.

This award, which is now in its seventh year, is made annually to the American woman, by birth or naturalization, who, in the opinion of a distinguished committee, has made the most distinctive contribution of the preceding year to the fields of American art, science, or letters.

Dr. Sabin has received it for her splendid contributions to mdical science, which include a complete study of the nerve-centers; the discovery of the origin and processes of the lymphatic system; the discovery of the development and processes of the blood-cell; the discovery of the functions of the monocyte, the white blood-cell which bears so directly upon the study of the tubercle bacillus and its effect on the human system.

These discoveries were made by Dr. Sabin in her own original research. Working with her associates, she had also had much to do with the analysis of the tubercle bacillus, and with the research work that is going forward toward a complete cure for this destroyer of the human tissues.

But what is most interesting to the women of to-day is that Dr. Sabin, by her genius and her concentration to her high purpose, has made it easier for all women who wish to enter the field of science with the hope that they, too, may some day reach the apex of achievement. It is an established truth that a way once hewn is easier for those who would follow after. Where one has been it is easier for others to venture. And Dr. Sabin's career has been a series of first adventures for women.

She was the first woman to be admitted and to graduate from Johns Hopkins Medical University. She was the first woman to be admitted as an intern in the Johns Hopkins Hospital. She was the first woman to be a member of its staff. She was the first woman to be a member of the teaching staff of Johns Hopkins Medical University, where she was professor of histology. She was the first American woman to be admitted to European research laboratories, working side by side with men in Italy and in the laboratories of Leipzig and Heidelberg. She was the first and is yet, to-day, the only woman to be made a member of our National Academy of Science, and was also the first woman to become a member of the Rockefeller Institute for Medical Research.

By the steady, quiet force of her ability for original work, her consecration to that work, she has won her way to a position in the world of science second to few men. Dr. Simon Flexner, president of the Rockefeller Institute, declares her to be the greatest living woman scientist and one of the foremost scientists of all time.

Dr. Sabin is the sixth American woman whose name has been added to the roster of Pictorial Review's Hall of Fame for Women. Previous awards have been made to Mrs. Edward MacDowell, for her work in establishing at Peterboro, N. H., a colony where artists may go to work in felicitous surroundings at small cost; to Mrs. Cora Wilson Stewart, for the establishment of the Moonlight Schools in the Southern mountains, where thousands of American men and women have been brought out of the darkness of illiteracy; to Miss Sara Graham-Mulhall, who has accomplished much toward the restrictions of the drug traffic in this country; to Miss Eva Gallienne, for founding the Civic Repertory Theater in New York, whereby the entire country has been stimulated to the need for good drama at a price that all can afford; to Miss Martha Berry, who established and maintained the Berry Schools at Rome, Ga., where over two thousand boys and girls of the Southern rural districts have been able to work their way to an education that would have otherwise been denied them.

The members of the Award Committee are: Senator Arthur Capper of Kansas, Mr. Otto H. Kahn of New York, Mrs. Mary Roberts Rinehart, Mr. Clark Howell of the Atlanta Constitution, Miss Ida Tarbell, Miss Mary Woolley, president of Mt. Holyoke University; ex-Senator James D. Phelan of San Francisco, Mr. Augustus O. Thomas, president of the World Conference on Education; Mr. Carl Sandburg, Mr. John Farrar, literary editor; Mrs. Charlotte Perkins Gilman, Madam Louise Homer, Dr. Henry Goddard Leach, editor The Forum; Mr. Edwin Markham, Mrs. Henry W. Peabody, Mrs. Edith Nourse Rogers, member of the House of Representatives; Mrs. John F. Sippel, president of the General Federation of Women's Clubs, and Mr. Walter L. Clark.

SPINAL ANESTHESIA*

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IT is believed that spinal anesthesia, like many great discoveries, resulted from an accident. Dr. J. L. Corning, of New York City, in 1885 produced temporary motor and sensory paralysis of the lower extremities while giving a therapeutic extraspinal injection of cocain. In 1891 Quincke established lumbar puncture as a diagnostic and therapeutic procedure. In 1899 Bier published the results of eight anesthesias which he had practised upon himself, his assistant and six patients. In spite of Bier's warning, this discovery was followed by widespread use. Spinal anesthesia was then soon abandoned due to the poor results occasioned by a lack of understanding of its very definite indications, contraindications and technic.

No method of anesthesia yet discovered has had such a rocky course as the spinal method, and it is my opinion that it is not thus far firmly established. Its long history of use and disuse is in marked contrast with the short, rather stable history of ethylene gas. This can all be explained by: (1) the fact that novocain though discovered in 1904 was not recognized generally as the safest intradural drug until a comparative study was made by Cary Eggleston and Robert A. Hatcher in 1919; (2) that the physiology involved in the sudden drop of blood pressure was not understood and therefore the drop could not be prevented. Even today many surgeons have not been convinced of the superiority of novocain.

Wayne Babcock,[1] of Philadelphia, has been one of the greatest proponents of lumbar anesthesia, both in experimental and clinical work, in this country. In 1911 he reported the results of 350 inductions, and in February, 1926, he recorded the results of over 20,000 inductions. In many European clinics the method is used extensively. Dr. B. Koch, Professor of Surgery at the University of Bratislava, with whom I worked for a short time, had used it in a series of over 6,000 cases and as is the case with Babcock, in 90 per cent of his operations below the diaphragm. At the present time it is used throughout the United States by many surgeons. It is our opinion that several years must elapse before its comparative value as an anesthetic will be determined. In the following review you will note that the indications, contraindications and the technic are very definite. One can blame a death under general anesthesia upon the drug, but under spinal anesthesia a mortality is usually to be blamed upon the surgeon (Babcock[1]).

The known indications may be classified as follows:

(a) *General*

1. Operations below diaphragm only, preferably below the umbilicus (Labat[7]), (Meeker[8]).
2. Age limits. Meeker states that children under sixteen years of age are usually not suitable subjects. Senility associated with debility calls for decreased dosage and often it is advisable to use a local anesthetic where degeneration of the vital organs is evident.
3. Systolic blood pressure must be over 100.
4. When general or local anesthesia cannot be used for any reason and this form is not contraindicated.
5. For diagnostic purposes when muscular relaxation allows more accurate localization.

(b) *Special*

1. Acute abdominal infections such as appendicitis, perforated gastric or duodenal ulcer or obstructive ileus.
2. Cases with high blood pressure not showing marked myocardial changes. Spinal anesthesia should be avoided unless sure of the heart.
3. Cases in which a general anesthetic is dangerous. (I have in mind a patient with chronic bronchitis, marked rectal prolapse, extreme toxemia from gangrene below the middle of the thigh, who under spinal anesthesia made an uneventful recovery following high amputation.)
4. Patients with renal dysfunction, high blood urea, albumin or casts.
5. Cases of acute or chronic respiratory infection. (We have operated several of these successfully.)

*Read before the annual meeting of the Interurban Academy of Medicine, Superior, Wisconsin, November 20, 1929.

6. In the field of operative obstetrics, including cesarean section (Pitkin[9]).

7. In many general diseases including diabetes, pneumonia, tuberculosis, eclampsia, complicating surgical conditions.

8. Operations such as prostatectomies, amputations, hernias, in suitable subjects. (We have used it often in reducing strangulated hernias.)

Contraindications:

Generally speaking, this form of anesthesia is contraindicated in shock, depression or hypotension from any cause. The failures are probably due in most cases to an unwise selection of the patient, the drug, the dosage or technic (Evans[4]).

Specifically, the contraindications may be listed as follows:

1. Cardiac embarrassment from any cause.

2. Mechanical limitation of the respiratory space (fluid).

3. Organic involvement of the cerebrospinal nervous system, such as brain tumor, intraspinal hemorrhage, cord tumor, or meningeal involvement.

4. Patients having great abdominal distention, marked jaundice, or extreme obesity are poor anesthetic risks. They are unable usually to withstand a sharp fall in blood pressure. Local anesthesia is here preferred.

5. Septicemia with positive blood culture.

6. Suppuration at site of puncture.

The greatest advantage of spinal anesthesia is in its application in some emergency operations where there has been no time for adequate preparation. I recently operated for a perforated duodenal ulcer. The patient also had a marked bronchiectasis. By using intravenous saline and adrenalin to combat the shock we were able to administer spinal anesthesia successfully. We did not use local anesthesia because the patient was apprehensive and complete relaxation was necessary.

The complete muscular relaxation facilitates the operative work. When properly administered there is very little metabolic disturbance or interference with the normal functioning of the heart, lungs, kidneys and intestines. Nourishment can be given following operation. It has been stated that post-operative gas pains are less noticeable. This has not been our experience. We, however, believe that post-operative shock is less.

The greatest disadvantage of this form of anesthesia is the too frequent appearance of danger signals during the anethesia. When the vasoconstrictors give way it is with a suddeness that is distracting to the operator. Even after carefully selecting the subject it is not always possible to know in which case the symptoms of collapse with pallor, sweating, distress, respiratory and cardiac failure will occur. The fact that the dose once injected cannot be recalled or prevented from acting and that the patient's life so closely depends upon the accuracy of dosage and skill of the surgeon, certainly should limit the indiscriminate employment of spinal anesthesia. After all, the one real disadvantage in this method of administration is that the anesthetic cannot be administered gradually until the stage of surgical anethesia is reached. The full dose must be administered at one time (Meeker[8]).

Mentally unstable patients are very apprehensive; they are not of the "local type." If the operation is to be prolonged, haste may lead to error. Hemorrhage has resulted from imperfect hemostasis due to the anemia at the site of operation accompanying the fall in blood pressure. Headache occurs occasionally. It may result from a decreased intraspinal pressure due to a leak at the puncture site (Pitkin[9]), an increased pressure (Jackson[5]) or to the presence of chemical agents in the needle or syringe incident to sterilization, which are injected into the lumbar sac, where they serve as irritants. It is a well known fact that headaches occur frequently following diagnostic lumbar puncture as well as after the injection of sera for the treatment of meningeal disease. Ocular palsies and meningeal infection are mentioned in the literature but we have not observed them.

It is important therefore that before using intradural injection one should understand the physiology and technic involved.

The physiological action of the drug depends upon the nerve roots involved and the extent of their involvement. When the drug is injected the feet and perineum are first affected. As the drug spreads, the anesthesia extends up the legs and body to a level corresponding to the highest nerve roots affected. The posterior or sensory roots are more completely anesthetized than the anterior. The drug also diffuses more readily over the posterior than over the anterior roots. Any anesthetic to be successful should produce

two effects, namely, loss of pain combined with muscular relaxation. The first is essential for the operation; the second is desirable that the operation may be done with greater facility.

To repeat, the physiology of intradural anesthesia is that of a transient root interruption, chiefly affecting the posterior roots, causing loss of tactile, muscle, and temperature sense. The anterior roots are also blocked, causing a temporary motor paralysis. The anterior root block affects also the white rami communicantes. This is the most unfavorable and hazardous action of the drug because it causes a temporary vasomotor paralysis. Babcock aptly states that for animals which sit or stand erect a vasoconstrictor system is essential. A snake has no vasomotor system, and when suspended by the head may suffer and finally die from failure of blood to ascend to the heart. A high spinal anesthesia produces the same condition when the head is raised or even placed on a level with the rest of the body. The white rami are associated with the anterior roots from the second thoracic to the third lumbar roots. Obviously, if only the lower lumbar and sacral roots are affected there will be very little effect on the blood pressure. However, if the higher roots supplying the great splanchnic vessels or those above are anesthetized, there will be a marked drop in blood pressure usually lasting from fifteen to thirty minutes (Babcock[1]).

It is evident that a precise technic must be followed in order to obtain the maximum efficiency with a minimum of danger. This will conveniently be divided into preoperative, operative and postoperative stages.

Our preoperative procedure is to give two allonal tables (each 2⅔ gr.) one hour before operation. Experimental study shows that barbital is a very definite antidote to novocain poisoning. This drug is therefore used routinely by many surgeons instead of allonal, 10 grs. being given (Kelly[6]). However, the novocain is used in such small amounts that toxic effects are rarely noted. We have not encountered novocain poisoning in over fifty cases and there is no record of its occurrence up to the present time at St. Luke's Hospital. One half hour before going to the operating room, the patient is given morphine gr. ¼ and atropine gr. 1/150 hypodermically. It is important that sedatives be administered in sufficient amount to counteract the fear accompanying the spinal anesthesia.

Minor preoperative details may be summed up as follows: An enema should be given at least three hours before operation and in rectal and gynecological work it is important that this interval be longer. The eyes should be covered. The patient should be taught to breathe deeply to combat nausea during operation. He is allowed to eat a light supper, but on the morning of the operation we prefer an empty stomach for two reasons: (1) because the nausea during operation may be accompanied by vomiting; (2) this form of anesthesia must often be supplemented by a general anesthetic.

Just before operation the blood pressure is recorded. Ephedrine is given hypodermically, usually 50 mgms. of the hydrochloride at the time of spinal puncture. It may be used with the novocain locally prior to puncture. The height of puncture is determined by the site of operation, the first lumbar space being used for upper abdominal, and lower lumbar spaces for operations at lower levels. Many operators lower the head of the table until the desired anesthetic level is reached. Novocain is put up in ampoules of 50-100 mgms. and we usually determine the dosage on the basis of 10 mgms. of drug to every 10 pounds of body weight. For higher anesthesia and more prolonged action more drug is needed, occasionally 200 mgms. being given in gallbladder and stomach surgery. We rarely use more.

A small Pitkin needle (gauge .22) is used to prevent leakage of spinal fluid at the site of puncture after induction. We do the puncture more readily in the sitting position, although with the patient on the side it is easier and quicker to turn him on his back and place him in the proper position for operation. The head of the table is lowered about 15 degrees. (Pitkin has devised a Tiltometer especially adapted to his method of spinocain induction.) During the operation the blood pressure is recorded every five minutes. If the systolic pressure goes below 60 we give 10 min. of adrenalin hydrochloride (1:1000) intramuscularly; if it drops below 40 or the pulse becomes imperceptible, or shallow respirations are noted, normal saline containing one drop of adrenalin to every 100 c.c. is given intravenously. It is important that this apparatus be always at hand and that if it requires

more than three minutes from the time the order is given to administer it, the technic is unsafe. According to Babcock[1] the brain degenerates and the patient's condition is hopeless if the circulation stops for 7 minutes or more. According to Meeker[6] cessation of heart action is always fatal if it persists a very few minutes. Therefore one can understand the importance of the rapid intravenous injection of normal saline with adrenalin.

We have observed the drop in blood pressure in twenty-five cases and found that in only six was there a drop of 30 points or more in the systolic pressure. Further, this drop occurred in the first five minutes after induction. A 30 point drop in the first five minutes was followed by a further drop in five of the six cases in the succeeding readings at ten and fifteen minutes after induction. In two cases the pressure dropped to zero at the five minute interval and remained so throughout the ten and fifteen minute periods. All of the six cases received adrenalin and four of them were given adrenalin plus intravenous saline. One patient died on the table. This patient was in extremis—a neglected appendix with pneumonia, paralytic ileus, and general peritonitis. He would not allow local, could not stand general anesthesia, and due to distention we could not diagnose the case without the relaxation that spinal induction afforded. I have personally seen three deaths under spinal anesthesia and have recently been told of others. It is well to remember, as I have said before, that if a drop occurs it is sudden and that it is almost always apparent in the first five minutes following induction.

After operation the patient should be moved very gently, never raising the head or body. The foot of the bed should be elevated for the first 24 hours on his return to the room. He should be watched closely for the first hour. Except where the operation itself or the condition of the patient contraindicates it, liquids may be given. Morphine is given for pain.

Postoperative complications were few. In twenty-five consecutive cases paralytic ileus was noted in one; pneumonia in one; immediate headaches in two; headaches after one week in four; vomiting in six cases.

Spinal anesthesia is now being frequently induced at St. Luke's Hospital. Since our first induction on August 6, 1928, until September 14, 1929, it has been used 168 times by eighteen surgeons in operations on the abdomen and lower extremities. In several cases anesthesia was incomplete. Competent observers state that it fails in 1 to 6 per cent of cases (Sise[10]). We have used it successfully in most major operations in the abdomen, pelvis, and on the lower extremities. We do not select it to the exclusion of other anesthetics, using it in approximately one out of every five operations. We rarely use it in upper abdominal surgery. It has a definite field of usefulness, but I believe it should be restricted: (1) to major operations; (2) preferably to those below the umbilicus; (3) to patients physically able to react from the drop in blood pressure.

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SOME RECENT ADVANCES IN ENDOCRINOLOGY*

ALBERT M. SNELL, M.D.
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IN the first quarter of this century more discoveries pertaining to the glands of internal secretion have been made than in any other period. Among these may be mentioned the isolation of thyroxine and epinephrine, the discovery of insulin, the isolation of the parathyroid and ovarian hormones, complete revision of knowledge of the pituitary gland, and many notable studies on the suprarenal bodies. Each of these discoveries has stimulated clinical research and has vastly increased both the diagnostic and therapeutic facilities of the physician.

It is my purpose to review here briefly some of the more recent endocrinologic studies and to discuss their clinical applications. The principal reason for such a review is that much of the work concerned is still in the experimental stage and is not generally known to the profession. It may be useful, also, as a sort of antidote to the literature on endocrinology with which some of the unethical pharmaceutical houses have circularized physicians. Perhaps at least 50 per cent of treatment by endocrines as applied today is fundamentally unsound from a scientific standpoint. In spite of rapidly increasing knowledge, this therapeutic field is still limited and can be extended only by painstaking and accurate studies. Understanding of the physiologic and pharmacologic activities of the various hormones recently isolated is of much value in developing conservative and scientifically correct methods of treatment.

PITUITARY GLAND

Among the most interesting studies of the last few years have been those dealing with the pituitary body. This gland has been the object of scientific curiosity since the earliest times. Ancient physicians held the theory that it was an excretory gland for the brain and that certain noxious materials were passed through the gland into the nose or pharynx. Its functions were practically unknown until Marie (1886) described the condition now known as acromegaly, and Minkowski (1887) suggested that this disorder was the result of disease of the pituitary gland. The development of knowledge in regard to the pituitary gland has gone forward steadily since Marie's work. Those interested in the progress are referred to the writings of Biedl, Swale, Vincent, Abel, Geiling and Evans. It suffices to say that the pituitary body is no longer regarded as a single glandular structure, but rather as a group of independent structures which elaborate at least four and possibly more hormones of very different natures and properties.

Physicians are indebted to Herring and his studies in comparative anatomy and embryology for present conceptions of the anatomy of the gland. It consists of four portions: the anterior lobe, glandular in structure and the source of a hormone which has a powerful effect on growth; the intermediate lobe, which invests the posterior portion of the gland and extends up the stalk; the posterior lobe, which is the source of the substance known by the trade name of pituitrin, and another epithelial lobe, the pars tuberalis, which surrounds the infundibulum and spreads out under the floor of the brain. The functions of this last portion of the gland are unknown, but it is undoubtedly of great importance to the organism, since experimental injury to it may be responsible for marked adiposity, disturbances of water metabolism, and so forth. The function of the intermediate lobe is likewise uncertain, although Atwell and Marinus, and others, have suggested that it may be the source of the hormone of the posterior lobe or of some precursor of it. The posterior lobe, according to this theory, may be a place for storage of pituitrin or conversion of these precursor substances.

Anterior lobe.—Only one portion of the pituitary body, the anterior lobe, seems to be essential to life; work on extracts of this portion of the gland has been carried on for some time, and a number of highly contradictory results have been reported. One of the first workers to report significant results was Robertson, who isolated a growth-stimulating substance which he

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the Northern Minnesota Medical Association, Bemidji, Minnesota, September 2 to 3, 1929.

called "tethelin." Since the publication of his work, many other extracts of the anterior lobe have been studied, but only recently has the problem of secretion of the anterior lobe been solved, chiefly through the efforts of Evans and Long. They have been able to prepare an extract of the anterior lobe, which on parenteral injection powerfully stimulates growth. They have obtained marked acceleration of growth in rats by the use of this substance; some of these animals will more than double their weight on this type of treatment. Extracts of this sort also will counteract the changes which appear in tadpoles after removal of the anterior portion of the gland. In their original work, Evans and Long described inhibition of estrum by means of these extracts. It is now known that these earlier results can be explained by the presence of substances other than the growth-stimulating principle. In an article published in 1928 Evans and Simpson claimed to have demonstrated the presence of two hormones of the anterior lobe: one is required for normal growth and development and the other for the development of the gonads, thyroid gland and suprarenal cortex. The effects of the second hormone on the gonads can be practically nullified by simultaneous administration of the substance that effects growth. They suggested that there is very exact adjustment of these hormones in early life in order that growth may be accomplished before the attainment of sexual maturity. They also suggested that the hormone of growth is derived from the eosinophilic cells of the gland and the gonadal stimulant from the basophilic cells.

Putnam, Teel and Benedict have carried this investigation a step further by their work on dogs. They have been able to prepare a pure and more concentrated extract of the bovine anterior lobe, which produces experimental acromegaly in dogs. Their animals gain rapidly in weight when treated with this substance, and definite overgrowth of the bones and viscera takes place. The animals have many of the characteristics of the acromegalic subject; in some, the huge extremities, clumsy gait, and decreased muscular activity are striking. Clinical studies indicate that this extract of the anterior lobe may be of value in the treatment of pituitary insufficiency in the human subject; an attempt to use the substance in the treatment of infantilism is now being made.

Posterior lobe.—The posterior lobe of the gland has long been known to be the source of an extract which is in every-day medical use and which has powerful pharmacodynamic properties. These are so well known that repetition is almost unnecessary. The extract of the posterior lobe, designated pituitrin, has the property of raising blood pressure, as shown first by Oliver and Schäfer, and Howell, of causing a powerful contraction of smooth muscle, particularly that of the uterus, and of having both diuretic and antidiuretic effects. It also affects the chromatic function of amphibians and has the definite property of raising the level of blood sugar. It has been assumed for years that these various properties were each due to individual hormones, although the unitarian theory had also had its strong adherents. The matter appeared to be settled when Abel and his associates,[2] in 1923, prepared from the pituitary gland a highly purified tartrate which possessed all the properties of commercial pituitrin. This salt was one of the most active and potent substances ever isolated; it had oxytocic properties more than 1,500 times as great as an equal quantity of histamine.

Recently, a group of investigators[27] in the laboratory of Parke, Davis and Company has demonstrated that there were two active principles in the posterior lobe. One of these, alpha-hypophamine, possesses the property of causing smooth muscle to contract; the other, beta-hypophamine, contains the pressor and the diuretic and antidiuretic principles. Both of these substances are basic bodies, presumably amines; they may be combined to form a mixture which has all the properties of ordinary pituitrin. These two substances have been prepared under the trade name of "oxytocin" and "vasopressin" and, through the courtesy of the original workers, my colleagues and I have been supplied with material for experimental and clinical study.

Kamm and his associates[27] have found that oxytocin has few properties other than its effect on smooth muscle. At the clinic we have had a similar experience, and have found oxytocin not to have any action on blood pressure, cardiac rate, urinary output or heat production. It causes elevation of the blood sugar when given in large doses, but its effect in this connection is considerably less striking than that of vasopressin, and may be due to the small amount of pressor substance which cannot be completely sep-

arated from the oxytocic fraction. This pressor substance resembles epinephrine in many respects, but on chemical examination it does not give a positive phenol ring test such as is characteristic of epinephrine. The original workers showed that it had a powerful pressor effect, and that in subjects to which it was administered tolerance of pressor activity would develop similar to the tolerance of patients to pituitary preparations. They have also shown that vasopressin contains the diuretic property of pituitary extracts, and also that it has antidiuretic properties. It was found that it has, like epinephrine, the power of raising the level of blood sugar and of partially neutralizing or overcoming the effects of insulin. These effects are not pronounced, and large doses are required to secure them. Unlike epinephrine, it does not exert a calorigenic effect, but rather depresses production of heat. The experiments demonstrating this were performed by Wilhelmj, who believes that the transient drop in metabolism that is observed is best explained on the basis of widespread vasoconstriction. The clinical results obtained with vasopressin and oxytocin are of great interest, but probably the greatest advance which the work of Kamm and his associates represents is along the lines of more exact physiologic knowledge of pituitary activity.

Clinical value of pituitary substances.—The clinical use of these recently isolated pituitary extracts is still in the experimental stage. The growth-stimulating hormone from the anterior lobe which investigators at Harvard are now using, is not as yet sufficiently purified to be available for general use in the human subject. It promises to be of great value in pituitary types of infantilism and in pituitary insufficiency produced by the sugical removal of tumors. Its exact status in the treatment of other pituitary disease is still uncertain. These experimental extracts appear to be the only principles of the anterior lobe which have any clinical value at present. The substance of the anterior lobe which is now sold for oral administration is probably inert, and careful testing of the hypodermic preparations of principles from the anterior lobe, now on the market, has been done with negative results. It is probable that the weight-reducing effects obtained by oral administration of dried substances of the anterior lobe may be due to the presence of certain amines which increase the specific dynamic action of protein foods.[5, 28]

Any further consideration of the therapeutic use of extracts of the posterior lobe is unnecessary because of the wide experience of the medical profession with pituitrin. The advantages

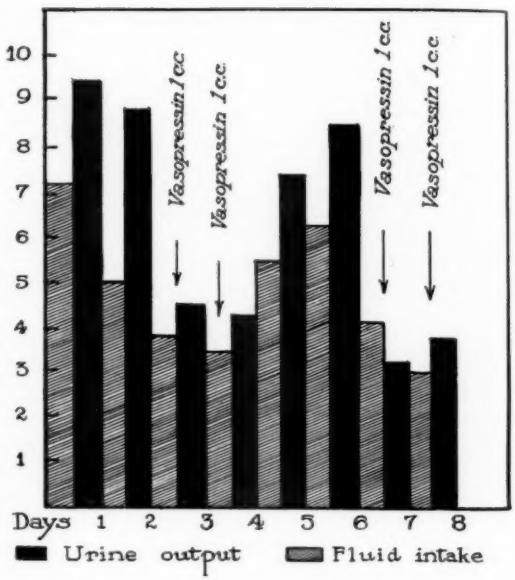

Fig. 1. The effect of vasopressin in diabetes insipidus.

of having the oxytocic and pressor functions in separate preparations is obvious. Oxytocin, or, as it has been renamed, "pitocin," is fully as effective for obstetric use as pituitrin and has the advantage of not elevating the blood pressure.[43] Vasopressin, or "pitressin," is of value for its pressor effects and is extraordinarily efficient in controlling the polyuria of diabetes insipidus (Fig. 1). The pressor principle has some other effects which are of great clinical interest. After operations on the pituitary body, shock may ensue, and there may be abrupt rises in temperature (hypothalamic fever), which cannot be attributed to infection. Vasopressin has been shown by Learmonth to have a definite effect on the abnormalities of heat regulation following operations on the pituitary body. He has demonstrated the beneficial effect of this substance on the blood pressure after such operations. Snell and Rowntree have found it to be of some value as an emergency stimulant in Addison's disease.

METABOLISM OF CALCIUM; THE PARATHYROID GLANDS

The second advance in endocrinology, which I wish to consider, is that which pertains to the regulation of metabolism of calcium. The interest in this field is chiefly due to the recent preparation of active parathyroid extracts which will cause elevation of the calcium of the blood serum. Before commenting on the effects of this extract, a brief statement of the knowledge of metabolism of calcium is necessary. For a more complete account, the reader is referred to Stewart and Percival's recent reviews.[52, 53] An adult requires about 0.4 gm. of calcium a day; a growing child, from three to four times as much. It is absorbed chiefly from the small intestine and is excreted into the colon. Two factors seem to govern the rate of its absorption: the presence of an adequate supply of vitamin D, and gastric acidity. The action of acid can be explained by the fact that it changes organic combinations of calcium into inorganic forms that are more readily absorbed. Calcium probably is excreted chiefly through the bowel, but, because large quantities of calcium pass through the intestinal tract unchanged, the daily rate of excretion is difficult to determine. Soluble forms of calcium are excreted in the urine in amounts of about 0.4 gm. a day in men and in smaller quantities in women. The principal function of calcium is, of course, in the formation of bone, but it is also necessary for the coagulation of blood and for the maintenance of a proper environment for living cells. The relation of the parathyroid glands to metabolism of calcium has only recently been recognized, although the glands were discovered by Sandström in 1880 and the condition of tetany which follows the removal of the parathyroid glands has long been appreciated.

McCallum and Voegtlin (1908 and 1909) demonstrated that after parathyroidectomy the blood calcium was decreased and that intravenous injection of calcium salts relieved the symptoms of tetany thus produced. Fourteen years later, their work was fully corroborated by Salvesen, who stated: "The symptoms of parathyroid insufficiency are due to calcium deficiency. The parathyroids control the calcium level of the blood and by doing so they influence the function not only of the muscles and nerve tissues but probably of all the organs."

Shortly afterward, Hanson, Collip and Berman, working independently, prepared extracts of the parathyroid gland which not only controlled the symptoms of tetany but which were capable of causing elevation of calcium of the blood serum in normal animals. Collip,[11, 12]

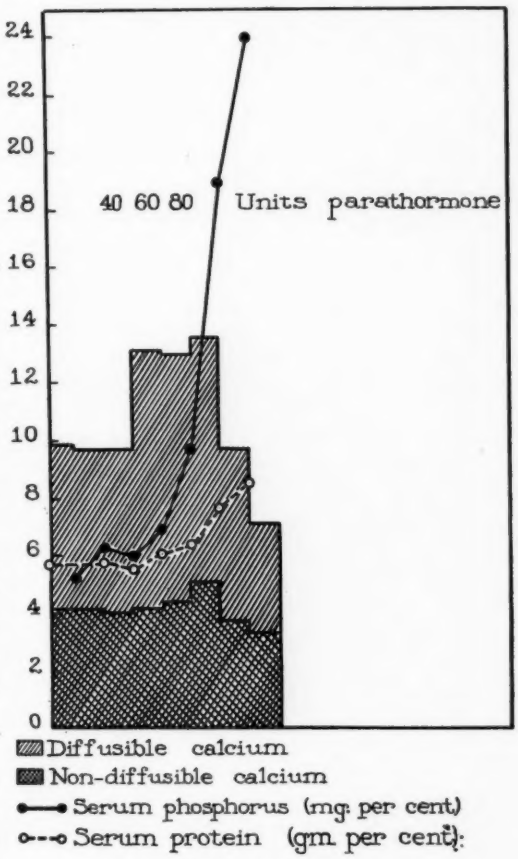

Fig. 2. Hypercalcemia.

whose work overshadows that of other investigators in this field, also demonstrated that if the parathyroid hormone was administered continuously in large doses, the blood calcium could be increased to double the normal amount; if treatment were continued, the blood phosphorus eventually rose and the nitrogenous constituents of the blood were greatly increased; the blood also became greatly concentrated. This condition, which is known as hypercalcemia (Fig. 2), may be fatal unless the use of parathyroid extract is discontinued.

During the administration of the parathyroid

hormone, there is a greatly increased excretion of calcium, which presumably comes directly from the bones. It is theoretically possible to decalcify the skeleton by the use of this substance, and there is no doubt that long-continued use may lead to definite skeletal defects. The best evidence on this point is given by the recent work on hyperparathyroidism. Barr, Bulger, and Dixon recently have described a case of hyperparathyroidism in which a parathyroid adenoma was present. The over-supply of parathyroid hormone thus produced leads to rarefaction of bone, to multiple cystic tumors of bones, muscular weakness, hypotonia, formation of calcium stones in the urinary tract, and abnormally high levels of calcium in the blood and urine. Removal of the parathyroid adenoma in this case, as well as in the cases recently reported by Wilder, and Stearns and Boyd, resulted in reduction of the blood calcium to the normal level, striking decrease in excretion of calcium and great improvement in the condition of the patient.

A word as to the mechanism by which the parathyroid hormone exerts its normal function is perhaps desirable, although the subject is not as yet fully understood. The blood serum is supersaturated with calcium phosphate, and much calcium can be removed from it by shaking with dry calcium phosphate.[23] This supersaturation is brought about by a series of equilibriums between diffusible and nondiffusible forms of calcium. About 50 per cent of the calcium of the blood serum is in combination with the serum proteins and cannot be removed by diffusion. There is also a freely diffusible and ionized portion, probably consisting of inorganic calcium salts. A third portion, nonionized, but diffusible also, exists, and probably represents the portion which is directly influenced by the parathyroid hormone.[9] The presence of a nondiffusible portion of blood calcium obviously explains why calcium does not entirely disappear from the blood after parathyroidectomy and also explains the low blood calcium encountered in nephrosis, kala-azar and other diseases in which there is a deficiency in serum protein. In these diseases, tetany is rare, although the blood calcium will reach the level observed in tetany. This seems to indicate that the diffusible portion of the calcium is that which protects the organism against tetany. There is evidence to show that the diffusible fraction is definitely increased by the administration of parathyroid hormone and that this diffusible portion is decreased after parathyroidectomy.[24] Imperfect experimental methods make this conception somewhat uncertain, although it has been partially confirmed. The function of the parathyroid hormone is probably exerted by its effect on the diffusible calcium, both ionized and nonionized, in the blood stream; in case of deficiency of calcium, more calcium, also diffusible, is drawn from the skeleton by its action. This diffusible portion is, of course, readily capable of elimination by the kidneys and bowel. Vitamin D appears to exert its influence, in part, through the parathyroid glands, since Hess and his collaborators have shown that ergosterol, which normally causes an increase in the blood calcium, does not have this effect after thyroparathyroidectomy.

Clinical applications.—It is obvious that the clinical use of parathormone is confined to two groups of cases: those in which it is desirable to bring about elevation of blood calcium temporarily, for relief of tetany, and those in which it is desirable to withdraw calcium from the body. The use of this extract in parathyroid tetany is well known and need not be considered here. It is also useful in the tetany of pregnancy[11,12] and in tetany associated with the diarrhea of nontropical sprue as Holmes and Starr, and Habein and I have shown. When parathormone is used to correct a condition of low blood calcium, the conjoint use of calcium salts and diets high in calcium and in vitamin D is necessary to prevent skeletal depletion. The use of parathyroid extract as a diuretic has been discussed recently by McCann and Meakins. The effects which are obtained probably are due to two causes: to increased excretion of fixed base (calcium) and to elevation of the serum proteins which may occur.

The use of parathormone as a decalcifying agent probably will receive more attention in the future. Aub and his associates[26] have shown that in chronic lead poisoning, lead is stored chiefly in the bones as the tribasic lead phosphate. They have shown also that any substance which increases the excretion of calcium will also increase the excretion of lead. Therefore, they have used large doses of parathyroid extract in the treatment of this condition, with beneficial results. Hench and I recently attempt-

ed to decalcify a patient who was suffering from chronic infectious arthritis, characterized by extensive deposits of calcium about the joints. The results were gratifying in that the patient lost considerable quantities of calcium and obtained increase in motion in the affected joints (Fig. 3).

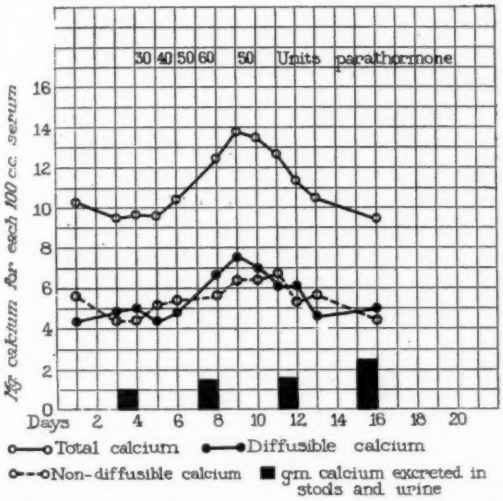

Fig. 3. The effect of parathormone on the calcium of the blood serum and the excretion of calcium in chronic infectious arthritis.

Parathyroid extract has been given by mouth for the treatment of various cutaneous conditions, as well as varicose ulcers, and sprue. The best authorities insist that it is without effect when given in this way, although the blood calcium may be elevated slightly by oral administration of parathyroid extract. Probably, however, the only proper use of parathormone is by hypodermic injections, and even there it is not altogether a safe substance for general use. The danger of hypercalcemia makes it necessary to determine the blood calcium frequently and its long-continued use undoubtedly will lead to skeletal defects. Curiously enough, tolerance to parathormone may be developed; this probably represents the refusal of the bony tissues to give up any more of the calcium which is needed for their integrity.

THE SUPRARENAL GLANDS

A third notable advance in endocrinology has to do with the function of the suprarenal glands. It has long been known that these structures consist of phylogenetically and functionally distinct portions: the cortex which arises from the wolffian body, and the medulla which originates in the embryonic sympathetic system. The secretion of epinephrine, which is a pure medullary product, is not the sole function of the glands. As numerous investigators[5, 13, 24, 55] have shown, the medulla may be removed or destroyed without the slightest effect on the health of an animal, whereas removal of both suprarenal glands is almost uniformly fatal. It seems from this that the cortex is the portion of the gland essential to life, and that the loss of cortical function is responsible for most, if not all, of the symptoms of suprarenal insufficiency. Kovacs reported a case of Addison's disease in which the cortex alone was destroyed; a similar case was recently observed at The Mayo Clinic. The desirability of studying the function of the cortical portion of the gland, and of obtaining an active extract from it, is obvious.

The function of the medullary portion of the gland in the intact animal is uncertain. Cannon expressed the belief that it may supply an emergency stimulant, whereas many other physiologists have thought that it is primarily a substance necessary for the maintenance of normal vascular tonus. The low blood pressure and asthenia of Addison's disease have been attributed, probably wrongly, to the failure of formation of epinephrine. The situation has been well stated by Hogben: "There are sufficient grounds to justify the conclusion that adrenalin is set free into the blood stream; it is neither unlikely nor proven that increased secretion of adrenalin plays a minor part in reënforcing the motor phenomena associated with fright and asphyxia, and there is no reason to believe that in mammals the chromaphil tissue serves a prominent or indispensable function in regulating the normal activities of the organism."

It has been suggested that the suprarenal cortex is necessary for growth and development, that it may neutralize toxic substances, and that it may be necessary for the formation of epinephrine from tryptophane. It has also been suggested that it has to do with the metabolism of lecithin and other lipoids. Alsterberg suggested that there is a close relationship between the secretory activity of cortical cells and the functional activity of the body tissues in general. A number of attempts have been made to prepare an active extract of the cortical tissue of the suprarenal glands; Rogoff and Stewart have

been pioneer workers in this field, and recently have prepared a substance designated as "interrenin" which appears definitely to prolong the life of suprarenalectomized animals. The clinical use of this substance in Addison's disease recently has been reported by them, with results which are somewhat difficult of interpretation, but certainly encouraging. At the clinic recently, observations have been made of a patient under treatment with this extract, who appears to have obtained definite benefit. It is only fair to say that the patients treated with interrenin have not lived longer or have not remained in better condition than certain patients who have been treated by the familiar Muirhead regimen.

The possibility that other active and biologically important substances may be derived from the suprarenal glands is now under consideration. Koehler,[29, 30, 31] of the University of Chicago, rerecently prepared a suprarenal extract which is epinephrine-free and which yet shows definite calorigenic activity. It was felt, at one time, that this substance might be the missing cortical hormone, but in a recent personal communication Koehler stated that this view was probably erroneous. The extract which he has prepared, however, has some very interesting properties. It appears to have a definite effect on metabolism of creatine and creatinine; the excretion of creatinine, which is a feature of many diseases characterized by muscular wasting and asthenia, is almost immediately reduced by the use of this substance. In such cases it is also capable of elevating the metabolic rate, of altering the curve of glucose tolerance, and of reducing the oxygen deficit after exercise. This substance has been used clinically with good effect in syndromes of exhaustion, presumably secondary to suprarenal deficiency. It has produced improvement in some cases of myasthenia gravis and in various forms of muscular dystrophy. There is not, as yet, sufficient evidence to warrant a decision as to whether or not this substance prolongs the lives of suprarenalectomized animals; in three cases diagnosed clinically as Addison's disease, my experience with it was unfavorable. Koehler, however, who has the advantage of a fresh supply, has treated one patient, with apparent benefit. All of the patients with Addison's disease who have been treated with Koehler's extract at the clinic were in a grave condition at the time treatment was started, which may explain their failure to improve. Further clinical studies are being carried out with this extract in a number of institutions in this country and a final report on its physiologic activity and clinical use may be expected shortly. At the present time, however, there is no available substance which will counteract or relieve the symptoms of suprarenal insufficiency.

SUMMARY

From the foregoing paragraphs, it is evident that, although much has been accomplished in the field of endocrinology, even more remains to be done. It does not seem likely that any new developments in the field will open up therapeutic possibilities equivalent to those that attend the use of insulin in diabetes, or of thyroid extract in myxedema. The endocrine structures, the functions and activities of which remain to be solved, seem far too complicated for simple solution.

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THE BOVINE THYMUS*

A Brief Description and Histological Study

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THE bovine thymus develops from the anterior pouches of the third and fourth branchial clefts, the neck-thymus originating from the third clefts, while the chest or heart-thymus develops from the fourth clefts. The bovine thymus, then, consists of two parts: a neck-thymus, which is broader at the base and smaller proximally, grooved on its inner surface for the trachea; and a heart-thymus, which lies in the mediastinum, smooth on its outer convex surface and concave on the heart side. In young calves these thymus glands weigh as much as 350 gms.

The heart-thymus is the first to retrogress, usually, having degenerated into a fatty mass at the end of two and one-half years, but vestiges of the thymus may remain in this location as long as three years. It seems that retrogressive changes do not begin to manifest themselves in the neck-thymus until the retrogression is complete, or almost complete, in the heart-thymus. Early retrogressive changes occur in the neck-thymus in the third year.

The neck-thymus persists in cattle up to twenty years, or longer. It persists longer in beef cattle than in dairy cattle.

The thymus is made up of cells of entodermal, ectodermal and mesodermal origin. Authorities differ as to the exact origin of the various cells found in the thymus and the matter is still under discussion. The histological structure is very much like that of the human gland, with the exception of Hassals' corpuscles, which are rarely seen, and the character of the giant cells in regard to the nucleus.

The bovine thymus in general resembles the same lobulated structure as that of the human gland. There is a more densely cellular dark-staining cortex, with a lighter central area, or medulla, less rich in cells. The cortex is made up of densely packed lymphoid cells and relatively few widely scattered giant epithelial cells. The medulla contains less lymphoid cells with relatively more giant epithelial cells than are found in the cortex. These large epithelial cells are mononuclear in contradistinction to these same cells in the human thymus, which are polynuclear. The nuclei are large and contain coarse granules which appear as long broken strands of a reticular-like network.

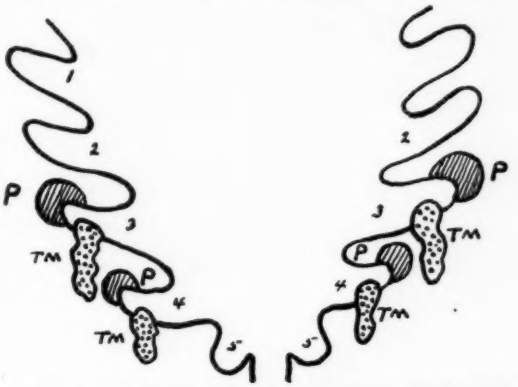

Fig. 1. A schematic illustration showing the origin of the thymus bodies from the third and fourth branchial clefts anteriorly. The superior and inferior parathyroids are illustrated as originating from the posterior pouches of the same clefts.

The nucleus is often situated at the side of the cell, and occasionally at, or about, the center. There is a relatively large amount of cytoplasm. These giant epithelial cells are stained faintly by eosin, with the exception of the periphery of, and the granules of, the large nuclei, which take a faint basic stain in contradistinction to the lymphoid cells, the nuclei of which stain deeply with hematoxylin.

These giant epithelial cells are more numerous in the neck-thymus than in the heart-thymus. The epithelial cells of the bovine thymus are peculiar to the thymus as the giant epithelial cells already described. However, the epithelial cells are found to be of varying sizes. The small ones have a large nucleus, larger than that of the lymphoid cells, with a relatively small amount of cytoplasm. The

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nucleus is more easily made out than that of the giant cell because it takes a slightly darker stain and the cytoplasm stains more distinctly with eosin. There are varying sizes of these cells from that of the small epithelial cell to that of the giant epithelial cell. The nucleus

Fig. 2. A photograph of the thymus of a young calf showing its relation to the trachea and heart. The lungs are laid back to expose the heart-thymus completely.

increases somewhat in size, but the notable characteristic of the giant cell is its relatively large amount of cytoplasm. It seems that these epithelial cells are various stages in the development of the giant epithelial cell, as they all exhibit the same staining qualities and general appearance of both the nucleus and the cytoplasm.

In addition to the lymphoid cells, there are cells with nuclei larger than the lymphoid cells, but with a very small amount of cytoplasm. Such a cell has been described in the human as being the result of the mitosis of the large epithelial cell. If this is true, it must serve the same function and, perhaps, in its turn attains to the giant size. The giant epithelial cells are essentially acid-staining, while the lymphoid cells take a basic stain.

Evidently there are two distinct and different substances in the thymus. The large number of lymphoid cells may carry on the function common to similar cells in the lymphatic system. It is well known that the blood of children before puberty contains a higher percentage of lymphocytes than that of adults. The giant cells, on the other hand, may be responsible for the secretion of a hormone peculiar to the thymus and, therefore, found in no other gland.

A precipitate obtained by glacial acetic acid from a saline extract of neck-thymus is a smooth paste of a delicate pink color like that of a beautiful pearl, while a similar precipitate of heart-thymus yields a white smooth paste, without any suggestion of a pink color. Is this due in any way to a greater preponderance of giant epithelial secretion?

The existence of a relatively large number of giant epithelial cells in the neck-thymus and the fact that the neck-thymus develops from the third branchial pouch (which seems to be the usual and main source of the thymus in the dog and the human where it is found in the chest and is called thoracic thymus) may be significant.

The first apparent changes in the beginning retrogression of the bovine thymus is a deposit of fat in the stroma between the lobules, which gradually increases as the lobules begin to shrink, so that in older cattle of eight to twenty years of age, the lobules appear as more and more widely scattered isolated islands, which become smaller and smaller. There is a marked diminution of the lymphoid elements, the cells and nuclei becoming smaller, though the giant cells remain in relatively larger numbers. This is not due to an increase in the number of the giant epithelial cells, but to the more rapid disappearance of the lymphoid cells. These giant cells at twenty years of age also show degenerative change to a marked degree. They lose their staining qualities. The nuclei become irregular in shape. The granules of the chromoplasm of the nucleus disappear and the entire nucleus takes on a faint basic stain as though these darker granules had gone into solution. The outline of the nucleus finally breaks down so that only the faintly staining cytoplasm of the cell remains. The color is a barely perceptible light pink under the oil immersion. In other places in the sections studied, simply spaces that were occupied by these giant

epithelial cells are found. Sections of an older bovine thymus require more eosin and less hemalum to bring them out. It is difficult to see the giant epithelial cells, even in sections from young calves, so as to make out their definite appearance as they are faintly staining and well camouflaged among the lymphoid elements. Studies of the giant epithelial cells were made under the oil immersion.

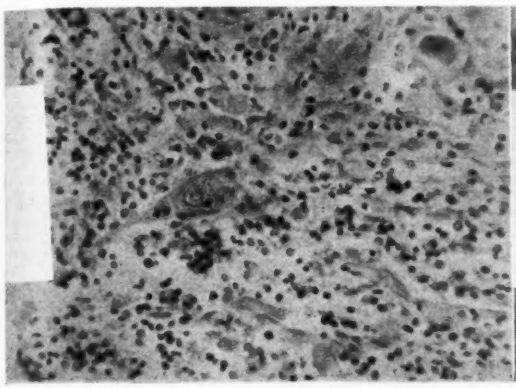

Fig. 3. High power microphotograph showing the giant epithelial cell of the bovine thymus. The large cell near the center shows the character of the nucleus.

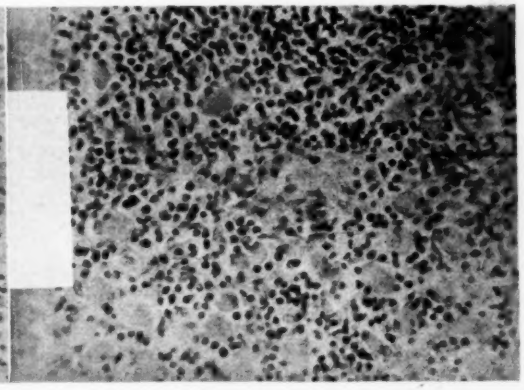

Fig. 4. Microphotograph showing the relatively large number of the giant epithelial cells found in the medulla of the lobule. The nuclei show faintly in places, but are very difficult to photograph because of their faint staining qualities.

This study has led me to suspect that, if the thymus gland has an internal secretion, or hormone, peculiar to itself, it is contained in this giant epithelial cell which is the true thymus.

Very little is known concerning the chemistry of the thymus. Several facts are of interest. Adenine is the predominant purine body, though guanine is also found. While the cells of this gland are very rich in nuclein bodies, they are relatively poor in proteins. Bang has shown that the thymus contains about the same amount of nucleoprotein, but about five times as much histone nucleate as the lymphatic glands. In other words—chemically the lypmh gland and the thymus have this in common: they both contain histone nucleate in large amounts. It can be precipitated from watery, also from weak alkaline extracts, by acetic acid. Extracts containing the lymphoid elements are rich in histone nucleate.

As far as the writer has been able to determine, all thymic extracts used, heretofore, in experimental work have been such extracts.

Arginase, guanase, adenase, and a proteolytic enzyme are found in the thymus. The proteolytic enzyme studied by Jones is interesting in that, contrary to trypsin, it acts best in acid liquids. It is readily destroyed by alkalies at body temperature.

As it is already known that the serum of the noncancerous has a far greater influence in retarding cancerous growth than that of the cancerous, and that of young infants about twenty-one times as powerful an influence in this direction, according to Engel, as that of the non-cancerous adult, it has already been suggested by some that this is thought to be due to the influence of the thymus as it is the only gland that shows marked retrogressive changes with advancing age. The only possible exception to this last statement is the posterior hypophysis, or pineal body.

With the idea that the internal secretion of the true thymus is locked up in the giant epithelial cells and on the supposition that this thymic internal secretion preserves normal epithelial health throughout the entire body, i. e., that it controls and keeps up normal epithelial growth and cell-repair, the writer set himself the task of isolating the true thymic hormone. In order to do this it seemed that a method of extraction that would break down the gland completely and that would exclude the lymphoid elements held out the best hope of solution. For this reason, the

writer has employed an original method that differs from all other known methods, which has resulted in the production of a clear extract with a protein content of about 2 per cent. This extract contains no histone nucleate. It is called Karkinolysin, because it

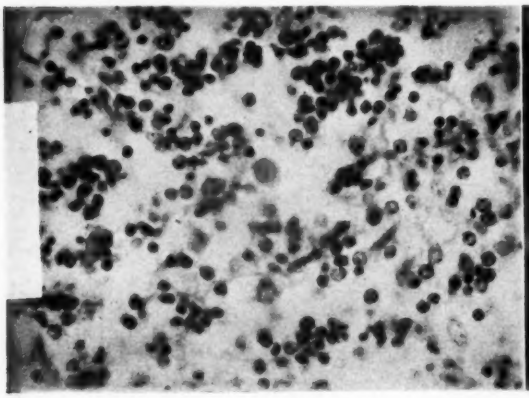

Fig. 5. Microphotograph showing the small epithelial cell of the bovine thymus.

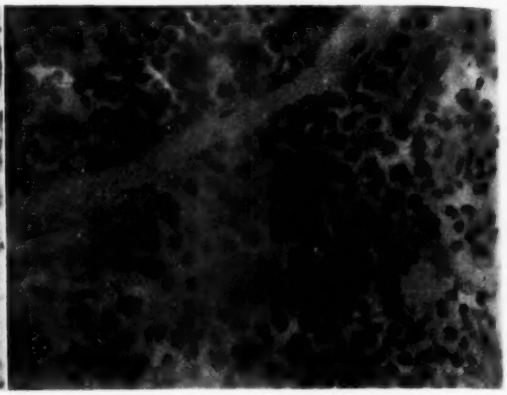

Fig. 6. Microphotograph showing the epithelial cells of various sizes in the bovine thymus. The darker-staining lymphoid elements at one side are readily identified.

seems to have a solvent action in carcinoma when injected intramuscularly daily over a period of months in highly malignant types and with as few as twenty injections in types of slower growth.

ACKNOWLEDGMENTS

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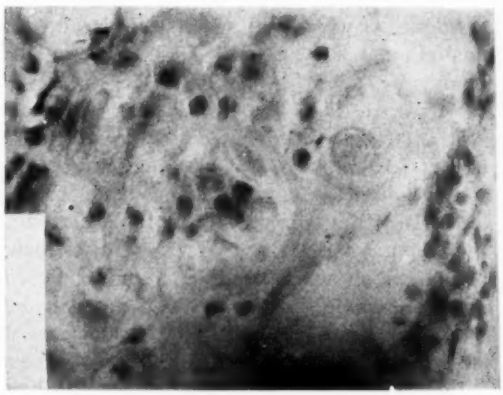

Fig. 7. High magnification of the giant epithelial cell in the thymus of a four year old cow.

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IODIZED OIL FOR DISEASES OF THE CHEST*

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VARIOUS attempts have been made in the past twenty-five years to find some non-irritating substance opaque to the *x*-ray for visualizing the bronchial tree. Bismuth oxide and subcarbonate insufflations, iodoform emulsion in olive oil, anhydrous thorium oxydate insufflation, bismuth subcarbonate suspended in olive oil have all been tried and in the main abandoned. Iodized oil on the contrary has been accepted universally since Sicard and Forestier made their first report in 1922. Since then it has attained a position in the diagnosis of diseases of the chest that is comparable in no small degree to the use of the barium meal in gastro-intestinal investigation or to sodium iodide solution for urologic examination.

In non-tuberculous diseases of the chest, the outstanding fact which the intra-tracheal use of iodized oil has made clear is that ectasis of the bronchi occurs much more commonly than believed heretofore. It is well, of course, to keep in mind the picture of the advanced bronchiectatic with cough of many years duration, with abundant, purulent, and frequently malodorous sputum, with the indefinite physical and *x*-ray findings, with the clubbed fingers, etc. But it is much more important to remember that bronchiectasis may not be advanced, that it may be not only early but dry. Iodized oil has taught us these two valuable lessons.

Furthermore, its use not only leads to a more exact diagnosis in a qualitative sense but gives a very precise idea as to how extensive any given bronchial dilatation may be and where it is located. These factors must be known definitely before any treatment can be instituted rationally.

Rules in medicine are dangerous by and large but I venture this one: That in all cases of chronic cough, dry or productive, where tuberculosis, heart disease, lung or pleural abscess and accessory nasal sinus disease (many people with chronic sinusitis have an associated bronchiectasis) can be ruled out, the injection of iodized oil is indicated to prove or disprove bronchial dilatation.

With lung abscess it is highly desirable to localize definitely the cavity or cavities, particularly if open drainage is anticipated. Here, intra-tracheal iodized oil may help, but in the majority of cases it will not. A number of factors are responsible for this failure. There may be a marked bronchial stenosis proximal to the abscess, a very common finding with lung abscess and one of the reasons which has made bronchoscopic drainage of this condition a very wise procedure; or the bronchial opening into the abscess may be so situated (the superior wall, for instance) that the oil cannot enter; or the size of the opening may be too small to permit the oil to pass, or there may be a plug of mucus or pus blocking the way or the cavity may be filled with exudate.

At times it may be desirable to outline clearly localized empyema cavities before operation. Iodized oil injected directly into the cavity does this decisively and especially so if *x*-ray films are made with the patient in various positions. Or again in certain obscure conditions intratracheal oil may reveal a partially stenosed bronchus which will lead to bronchoscopy and a more definite diagnosis. In outlining tracheo- or broncho-esophageal fistulas, iodized oil is preferable to barium because of its blandness.

In tuberculous diseases of the chest iodized oil should be used with discrimination. Some men contend that the presence of pulmonary tuberculosis is a contra-indication to the introduction of iodized oil into the tracheo-bronchial tree. I cannot agree with this restricted attitude. Others feel that acutely active lung tuberculosis militates against the use of the oil and with this view I concur heartily.

I have used iodized oil in tuberculous patients or suspects for two main purposes:

(1) For study of unexplained hemoptysis.

(2) For further investigation of unsuccessful thoracoplasty.

In studying persons with unexplained hemop-

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tysis, iodized oil has been utilized with early or dry bronchiectasis in mind. It is taught today that ninety-five per cent of unexplained hemoptyses is due to pulmonary tuberculosis. I doubt this. There can be no doubt that there is a tuberculous basis for a high percentage of these hemorrhages, but I am convinced by experience that some of the ninety-five per cent are bronchiectatics. It is being appreciated more generally that bronchiectasis is a frequent cause of hemoptysis which at times is profuse. The judicious use of iodized oil will save many persons in this group of unexplained hemoptyses an unwarranted diagnosis of pulmonary tuberculosis.

In any group of thoracoplasty cases there will always be a number who continue to cough and raise sputum, which may or may not contain tubercle bacilli, in the face of what appears to be a good collapse. Physical examination in most of these people tells no more than was known before. Stereoscopic films of the chest may not be helpful because of extensive fibrosis, thickened pleura, or both. Despite the more or less empirical warnings in the literature, I began using intra-tracheal oil in a few selected thoracoplasty patients who had not exhibited reasonable improvement. Nothing eventful happened and the oil did disclose the reasons for failure. It was found that unsuspected bronchiectasis, unclosed cavities, or both, were the main causes of unsuccessful thoracoplasty. These findings, which were consistently present in subsequent cases, led to routine phrenic nerve avulsion, preliminary to thoracoplasty, and to more extensive rib resections.

Iglauer and Kuhn[2] feel that brominized oil is more suitable for tuberculous patients. The technic necessary is not as simple as with iodized oil and they admit that the shadow cast by brominized oil is not as dense. I have followed some forty tuberculous patients at Pokegama Sanatorium and at the Ancker Hospital Tuberculosis Pavilion who have had iodized oil injected intratracheally, and I see no reason for discontinuing its use, providing the tuberculous lesions are chronic and other contraindications absent.

There are five methods for introducing the oil into the tracheo-bronchial tree: (1) supraglottic; (2) transglottic; (3) subglottic; (4) passive; and (5) bronchoscopic. I have used the supraglottic route exclusively in over two hundred injections and have found it quite satisfactory. Any portion of the bronchial tree can be reached by altering the position of the patient, as the oil is heavy and gravitates readily.

Smyth and Schall[6] make a strong plea for the bronchoscopic method, believing that a thorough cleaning of the bronchial tree is essential before the oil is injected. I have not found this to be so and further feel strongly that a person with lung tuberculosis should not be submitted to bronchoscopy except for emergencies. Ochsner[3] favors the passive method; Pritchard[4] the supraglottic. In small children either the subglottic (puncturing the crico-thyroid membrane) or the bronchoscopic method must be used for obvious reasons. The youngest patient I have injected was eleven years old and no difficulty was encountered with the supraglottic method.

The possible complications from attempting to inject iodized oil into the tracheo-bronchial tree are:

1. Acute enteritis. This results from swallowing the oil, with subsequent liberation of free iodine by the action of the alkaline intestinal secretions. This has not occurred in any of my cases although some have managed to get oil in the stomach.

2. Iodism. This may result from swallowing oil or may occur because of an idiosyncrasy. This also is uncommon. It has happened only once in a mild form in my experience.

3. Aspiration pneumonia and lighting up of old tuberculous foci are two other possible complications but I have seen neither of them.

The two most important contraindications to the use of iodized oil intra-tracheally are:

1. Acute or recent upper respiratory infection.

2. Acutely active tuberculosis of the lungs.

It is well also to refrain from using the oil in any condition in which freedom from even mild strain is imperative.

The ultimate disposition of iodized oil after it has entered the tracheo-bronchial tree and lung parenchyma is interesting. The iodine is liberated so slowly that it does not irritate and is eliminated in the urine. The oil in the pulmonary alveoli, according to Brown,[1] is taken up by phagocytes apparently of endothelial origin which follow on into the lymphatic system. It is questionable whether direct absorption or digestion of the oil occurs. A certain amount of the

oil is eliminated by expectoration. Some people will retain for months enough oil in their lungs to cast a shadow on an *x*-ray film with no demonstrable ill-effects.

The potential therapeutic action of iodized oil has held forth enticing possibilities because of its iodine content. Many men have been impressed by its action on bronchiectasis. I have given series of injections to ten persons with bronchiectasis. Six had enough reduction in cough and sputum to have returned asking for more oil. Three showed no improvement. In one instance only have I been able to render a patient with definite bronchiectasis, cough- and sputum-free. Pritchard thinks that if used repeatedly (twelve to sixteen injections at weekly intervals) iodized oil produces fibrotic changes in the bronchial wall and surrounding lung parenchyma with subsequent shrinking and in early cases of obliteration of the dilations. This has not occurred in any of my cases.

Ransohoff and Heiman[5] have called attention to the beneficial action of iodized oil in treating empyema and reported four acute cases and one chronic which healed promptly after its use.

It seems, therefore, that iodized oil has some curative value. In the main, however, it will remain a diagnostic agent in diseases of the chest as in other fields, with any reputation for healing occupying a position of secondary importance.

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THE VALUE OF THE *X*-RAY EXAMINATION IN PULMONARY TUBERCULOSIS*

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THE importance of the *X*-ray examination in the diagnosis and study of pulmonary lesions, especially tuberculosis, is well known. The amount and character of the information obtained by this method is not so clearly understood. In order to be able to appraise the results of an *x*-ray examination, the limitations, possibilities, and factors of error in the method must be defined.

The technic of the *x*-ray examination of the lungs is of the first importance. Fluoroscopic examination is of little value in the diagnosis of early or minimal tuberculosis. In the later stages, gross lesions may be recognized and much information may be gained in particular cases, but on the whole the results of fluoroscopy are neither accurate nor dependable. Films of the lungs must be made, preferably stereoscopic, the latter being of especial importance in the diagnosis of the early case. The films must be technically almost perfect. In order to achieve this it is necessary to have a powerful *x*-ray transformer capable of sufficient energy to make very rapid films. Intensifying screens must be fast, flawless, and much have good contact with cassettes. This necessitates frequent changing of both screens and cassettes. A fine focus tube must be used and the films must be made without movement or breathing on the part of the patient.

It is dangerously easy to obtain findings simulating early tuberculosis or to obliterate the signs of an early tuberculosis as a result of poor technic. Most of the errors which we observe, however, are on the side of overinterpretation rather than underinterpretation. It must be borne in mind that the roentgen diagnosis of tuberculosis is considered to be a very certain one; a patient should never be stigmatized with it without adequate evidence. It is a frequent experience to see a diagnosis of pulmonary tuberculosis made from the *x*-ray examination because of coarsening of the normal broncho-vascular markings in the lung. This may be due entirely to a broad focus tube, or to lack of speed. On the other hand, if fine detail is lacking in the film of the chest, minimal tuberculosis may be easily overlooked.

If we assume that the *x*-ray technic is good, what can we determine from the roentgen examination of the lungs in a patient suspected of tuberculosis? The first consideration is whether there are any abnormal changes in the lungs. The symptoms of tuberculosis may be simulated by a host of other conditions. Tuberculosis may exist in the body elsewhere than in the lungs and give the same systemic symptoms. The roentgenogram presents a fairly accurate picture of the pathology in the lungs; in many cases almost as accurate, when properly interpreted, as a gross pathological examination. The absence of any abnormal changes is the best, the most conclusive, evidence against pulmonary tuberculosis that we now have. It can be stated that, in the presence of symptoms due to tuberculosis of the lungs, some *x*-ray signs will almost always be present if an adequate examination has been made. With only one or two exceptions, I have never seen a case presenting symptoms of tuberculosis and which eventually proved to really have pulmonary tuberculosis in which the *x*-ray examination was negative. In the absence of *x*-ray signs, therefore, the presumption is overwhelmingly against the diagnosis of tuberculosis in the lungs.

On the other hand, it is often astonishing to find extensive changes in the roentgenogram of the lungs which were unsuspected even after careful examination by experienced clinicians. This occurs sufficiently often to point out the necessity for roentgen examination in every case suspected of pulmonary tuberculosis. Even if the physical examination is entirely negative, no patient presenting symptoms suggestive of tuberculosis should be allowed to go without an adequate *x*-ray examination of the lungs. In most cases the *x*-ray signs are present before the physical signs become apparent. The presence of typical roentgen findings is positive evidence of pulmonary tuberculosis second only in certainty to the finding of tubercle bacilli in the sputum.

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It should be noted, however, that not infrequently abnormal changes are present which are not typical. Under these circumstances the *x*-ray examination merely indicates the presence of pathology; the clinical examination must determine whether it is tuberculous or otherwise. Usually the coördination of symptoms, physical signs and *x*-ray findings will determine the diagnosis definitely. Frequently it is necessary to reexamine at an interval of one or two months to rule out the possibility that the lesion which has been observed was due to some acute condition. Cases of atypical bronchopneumonia, especially those secondary to influenza, pulmonary congestion, acute bronchitis, chronic bronchitis and bronchiectasis, chronic or unresolved pneumonia, and chronic lung fibrosis, may be difficult to differentiate at times; the clinical findings in some cases and reexamination with the *x*-ray in others will usually indicate the correct diagnosis.

Shadows in the lung fields characteristic of tuberculosis do not, however, necessarily mean active tuberculosis. This is exceedingly important because such a large percentage of apparently normal individuals have healed lesions which may give more marked *x*-ray findings than a recent active infection. For example, changes in and about the lung roots in adults are very commonly present and, in themselves, are usually of no importance. Fibroid lesions in the apex, pleural thickenings, and calcifications in the lung fields are very frequently seen but in most cases they have no clinical significance. All other types of shadows usually have a more important bearing on the immediate condition of the patient but the actual activity cannot always be determined with any great certainty by the *x*-ray examination. It is true that in some cases the sharpness, density, and discreteness of the shadow may clearly indicate a healed or quiescent lesion. In others a hazy, radiating, not sharply demarcated, soft-looking shadow may determine definitely that the disease is active. In general, however, the activity or quiescence of the disease should be determined by the symptoms and physical signs.

The diagnosis of tuberculosis having been established, much more information may be had from the roentgen examination and here again the accuracy of this method is of great value. We can determine the extent of the lesion, whether it involves more than one lobe, or more than one lung. The demonstration of the complete freedom of one lung from disease is obviously of the greatest value as an indication of whether or not surgical procedures should be used for therapy. The extent of the lesion will to a large extent determine the prognosis.

The character of the tuberculosis present may also be made out in this way. In general, pulmonary lesions may be classified as exudative or proliferative, although in most cases both types are present. The proliferative lesions tend to give rather sharp, fibrotic-looking dense bands, or moderately discrete, fairly dense nodules. The exudative types are more likely to be hazy, feathery, not sharply outlined, very irregular masses. Usually the latter indicate a very active, somewhat malignant, rapidly progressing process. On the other hand, if cure takes place, the exudative type of lesion will show the least amount of scar and residue. It is often astonishing to see the complete disappearance of what appeared originally to be a far-advanced tuberculosis. Much of the shadow seen in this type of case is really due to secondary collateral inflammation in the lung rather than to actual tuberculous infiltration.

The presence of cavities, of course, modifies the outlook in any case of pulmonary tuberculosis. Their presence can be most easily detected by *x*-ray examination. Acute miliary tuberculosis within a week after its onset usually gives definite *x*-ray findings and a definite diagnosis may thus be made very early. Tuberculous pneumonia, pleural thickenings and pleural effusions, spontaneous pneumothorax, can be accurately delineated often long before the symptoms or physical signs make the diagnosis possible.

Finally, there is no better method for observation of the patient with pulmonary tuberculosis than serial roentgenograms. These give an accurate history of the pathological events which are taking place in the lungs. The extension of the tuberculous process to a lower level in one lung or to the other lung, the appearance of a cavity, the development of a bronchogenic dissemination or of a miliary spread, all can be clearly demonstrated if *x*-ray films are made at suitable intervals with a reasonably constant technic. On the other hand, the gradual progress of an active exudative lesion into a quiescent proliferative one can be readily observed. The appearance of fibrotic bands, pleural adhesions, retraction of the trachea, mediastinum and diaphragm, and the

deposition of calcium in the lung fields and mediastinal lymph nodes—all the evidences of a healing process—can be clearly discerned in this manner.

During the course of collapse therapy the roentgen examination is invaluable. The amount of pneumothorax, the degree of lung collapse, the onset of complicating pleural effusion, the position of the diaphragm after phrenic exuresis, and the position of the bony thorax after thoracoplasty, can all be best observed by fluoroscopic and repeated film examinations.

It is outside the scope of this paper to discuss the actual diagnostic criteria of pulmonary tuberculosis in the roentgenogram. I must reiterate that most of the errors lie in overinterpretation of normal findings. This is particularly true of the vascular markings in the lungs which under various conditions may be accentuated. It must be borne in mind that the first and only pathognomonic lesions of tuberculosis are the tubercles. These are in the parenchyma of the lung and tend to give nodular areas of density or a veil-like shadow near the periphery. They do not follow the vascular tree in any organized form and varying accentuations of the latter are usually of little significance in the diagnosis of pulmonary tuberculosis.

SUMMARY

1. Technical factors in the roentgen examination of the lung for tuberculosis are of great importance. Fluoroscopy is of little value in the diagnosis of early cases and stereoscopic films of the highest quality are imperative.

2. A negative *x*-ray examination is the best evidence against pulmonary tuberculosis that we have. In the presence of symptoms due to tuberculosis in the lungs the *x*-ray examination is almost always positive.

3. Every patient with symptoms suggestive of pulmonary tuberculosis should have an adequate *x*-ray examination regardless of a negative physical examination.

4. Next to a positive sputum, characteristic *x*-ray findings are the most positive evidence of pulmonary tuberculosis.

5. The *x*-ray findings frequently do not indicate whether the tuberculous lesion is active. This may be better determined by the clinical findings.

6. The roentgen examination gives an accurate picture of the extent and type of the tuberculous lesion which is present. It is an invaluable aid in determining the type of therapy to be used, the effects of therapy and to follow the progress of the disease.

THE MANAGEMENT OF TUBERCULOSIS*

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"When we consider the transcendent importance to the human race of the observations of Koch on the etiology of tuberculosis, and the completeness of his demonstration of the communicable and preventable character of the disease, it seems difficult to understand the limited extent of the sanitary procedures since adopted for its restriction. The imperative demand for the enforcement of comprehensive measures for the prevention of tuberculosis should have been as evident to sanitarians twenty years ago as it is today."

—Herman M. Biggs, 1904.

TWENTY-FIVE years have passed since Dr. Biggs made this statement. Koch is credited with the prophecy that "not until a younger generation has appeared which has had a different scientific training, and holds views more in harmony with the known facts regarding the etiology of tuberculosis, will it be possible, in my opinion, to bring about an intelligent supervision of the disease." With both retrospect and prophecy before us, let us evaluate the accomplishments which have been made in the management of tuberculosis.

The attitude of the profession towards tuberculosis in the past was one of interest in a continuous study of pathology from the time of diagnosis to the time of death. The patient contributed his part by remaining immobilized for weeks and months, optimistic and hoping for recovery, while the doctor separated himself from the patient by an impassable gap, waiting for death.

The management of tuberculosis has become a specialized problem in medical administration. Many difficulties have been overcome. Many advantages have been recognized and accepted. Sir Edward Newsholme has concluded, after making an exhaustive study of the results of isolation in tuberculosis control, that, "If you will isolate twenty per cent of the open cases of tuberculosis in any community for a period of four months each year, the death rate from the disease will show in that community a yearly decrease of two per cent. Since 1900 the sanatoria in the United States have increased from 42 to 700, while the beds for cases of tuberculosis have increased from 3,600 to 73,000.

As facilities have been provided for the care of the tuberculous, a marked reduction in the death rate confirming Newsholme's conclusions has occurred. In 1900 the death rate was 202 per 100,000 population, while in 1926 the death rate had fallen to approximately 87 per 100,000 population.

The sanatorium has evolved from a primitive institution to one that meets the requirements of modern treatment. Dr. David R. Lyman has said, "Our first idea of a sanatorium was a porch, a reclining chair, a rule book, three quarts of milk and six eggs a day, and a chest examination once a month. In those days a sanatorium was usually conducted by a sick doctor who had been hired principally because of the fact that he was cheap. We have found out that tuberculosis work, whether in the sanatorium or hospital, requires as high a grade of medical service as that of the most modern general hospital."

The sanatorium, from this primitive conception, has gradually become a socially-minded institution, and as a result it has extended its activities into the community it serves. The tuberculosis field nurse has become an adjunct to the sanatorium whose value can not be overestimated. The medical staff are health officials doing in their sanatoria epidemiological work of great value and importance. The sanatorium has become the center for many health activities in tuberculosis work. It has changed so much in construction, administration, equipment and service, that it does not differ materially from the general hospital. This change has been brought about so quietly and so completely that the first recognition of the fact has come through the demand for the use of tuberculosis beds in general hospitals. The acceptance of such cases in general hospitals is a compliment to the sanatorium. They meet on common ground for a single purpose. The fact that most communities are served by general hospitals, and that comparatively few are served by sanatoria, makes it possible to

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promptly isolate open cases by the use of these additional beds in general hospitals. The immediate use of general hospital beds in the community reduces prolonged exposure at home while remaining on the waiting list for admittance to either a local or distant sanatorium. The open case in the general hospital is possibly of greatest value for the training it gives to doctors, nurses and attendants in preventive methods. It results in the popularization of sanatorium teachings and practice throughout the entire medical and nursing professions. It is true that tuberculous patients offer a risk to both hospital personnel and to the other patients; so also do pneumonia, typhoid fever, influenza, syphilis, and dysentery cases constitute a risk to those not infected. The problem is in the early recognition of the possible danger in each type of disease and sterilizing the infected discharges before they are permitted to enter an environment that eventually leads to contact with another human being. The danger of contact tuberculosis infection does not lie in the fact that a known open case is housed next to a susceptible person, but that many unknown cases are carelessly establishing such contact. The opening of general hospital beds will increase many times our capacity for the prompt hospitalization of cases, and the training given will result in a tremendous advantage to our future anti-tuberculosis work. The sanatorium can no longer be considered other than a specialized hospital. It teaches its patients the value of routine and self-discipline. Its patients hospitalized for long periods of time have many intercurrent disabilities which demand immediate and expert attention. The sanatorium takes an active interest not only in the convalescence of its sick, and their eventual discharge, but also their social and industrial re-establishment. The use of general hospital beds for tuberculosis cases will add more treatment beds than can be acquired through any sanatorium construction program. Prophylactic technic will become a procedure in common use throughout all hospitals. This change in the physician's attitude towards the care of tuberculosis will bring about a saner appreciation of the problem as a whole throughout all classes of society. The sanatorium has become, and promises to become even more, a community health center where health habits and health discipline are major activities.

The management of tuberculosis, the study of its prevalence as well as the many phases of its epidemiology, cannot be made a part of our future plans of offensive warfare without the aid of carefully and daily compiled records. The newly admitted patient must have records, and these records must be studied individually and collectively. The end-results of such data and study will be a check upon the efficiency in terms of service which the sanatorium renders the community it serves.

The successful management of tuberculosis depends largely upon the accurate interpretation of its epidemiology. Much of the data invaluable to the epidemiologist can be gotten only in the sanatorium. Good institutional administration must have such data recorded and accumulated for this study. It is, therefore, essential that complete coöperation exist between the leaders along the entire offensive front. It is problematical whether it is good tuberculosis control (surely it cannot be considered good logic) to include in the preventorium parenchymal and juvenile types of the disease. The tuberculosis school of the Lymanhurst type has proven itself more economical and epidemiologically safer than the preventorium which houses mixed types or permits association with adult cases. So far as the management of tuberculosis is concerned, the school, the preventorium, the sanatorium and the clinic are each an instrument of its epidemiology. In order that these instruments may be manipulated to the greatest advantage in tuberculosis control, some central control of the problem must be developed and maintained.

Since the discovery of the tubercle bacillus in 1882 by Koch, the most outstanding improvement added to the treatment of tuberculosis is the acceptance of surgery by the tuberculosis specialist as a routine mode of treatment. This has not only aided in the recovery of individual cases, but has radically altered our conception of the management of the disease. In the past, laws were frequently enacted providing that one sanatorium should care for early treatable cases, while another was designed for far advanced cases only. Surgery has upset the feasibility of any such arrangement. Many cases rated under this interpretation of legal enactment as far advanced would remain indefinitely for domiciliary care. With the aid of surgery, spectacular recoveries have been effected. With the possibility of surgical interference, all cases of pulmonary tuberculosis must be considered as treatable until the terminal stage has been reached. This radi-

cal change introduced into the therapy of tuberculosis has revolutionized its management from the patient's as well as the physician's point of view.

The point of breakdown is always a landmark in the history of each case of pulmonary tuberculosis. At this point toxemia overcomes resistance, making it difficult or impossible for the patient to carry on. Prior to and leading up to this event the patient gives rather accurately a history of a train of symptoms beginning from a fairly well identified incident or date which leads to the third milestone in the development of clinical tuberculosis—the end-results of a series of accidents which began with the initial infection followed by the onset of definite and continuous prodromal symptoms eventually bringing the patient to the point of breakdown. The prodromal period in pulmonary tuberculosis is as characteristic of this disease as is the prodromal period of typhoid, measles, smallpox or lobar pneumonia. Frequently the infection does not progress far before the individual wins the battle and the prodromal symptoms are aborted or controlled. Most frequently the infection does not progress sufficiently to usher the individual through or even into the prodromal stage. It is a very small minority group of those originally infected that ultimately reach the point of breakdown. Yet it is this relatively small group that make tuberculosis the problem that it is. The biology of the tubercle bacillus is such that it must depend upon this small but selected group of human beings to live and propagate. The most successful warfare against tuberculosis is that carried on before the infected body has been converted into a host. To give the patient the greatest benefit of treatment the disease must be identified while still in the prodromal stage.

The patient knows rather accurately the circumstances surrounding the onset of prodromals that have led up to the point of breakdown. Cases that become far advanced through progressive infiltration do so quickly following the initial breakdown or subsequent periods of reactivation. If medical science is to aid the tuberculous it must be given early through focusing its energy upon the identification of the disease before the point of breakdown has been reached. Identifying the early case becomes of importance only if hospitalization can be immediately secured and treatment initiated. The initial infiltration is frequently the only one. This may be either minimum or extensive so far as area involved is concerned. Spreads from the initial lesion, while frequently observed, are relatively rare. The far advanced case and the minimum case have suffered in varying degrees from similar accidents. Further spreads from the original infiltration are usually due to causes other than those responsible for the original lesion. The far advanced case frequently remains so throughout a long period of observation, showing little or no tendency to, or evidence of, progression. The minimum case only occasionally will show progression into the far advanced group by a series of spreads. Effective treatment must depend upon the diagnosis being made as early during the prodromal period as possible and immediate bed rest provided. The closer to the onset of initial symptoms, and the postponement of the time of breakdown that treatment can be instituted, the greater will the results be from such treatment.

Regardless of how we approach the management of tuberculosis, we will persistently return to the two pillars upon which the entire problem rests, treatment and epidemiology. The one can be carried out to most advantage in the sanatorium; the other is more comprehensive and includes the sanatorium as well as the entire environment of the patient and his associates.

The recent work showing the prevalence of pulmonary tuberculosis among children of high school age, the advantage to the patient in establishing an early diagnosis, the significance of the skin reactions, all give abundant evidence of the fact that the effective control of tuberculosis is closely related to its epidemiology. Every sanatorium should be as active in the study of the epidemiology of the disease as they are in its therapy. Only by making the sanatorium a center in the community for the collection of data, the dissemination of knowledge and making epidemiological studies in the families who have members on the cure as well as making it a place to receive and care for those actually ill, can the institution serve its mission. The sanatorium must become more than a repository for sick bodies. It must be alive to its opportunities for study and service. If the sanatorium is to maintain its position of leadership in tuberculosis work it must offer both positive therapy to the sick and positive service to the community.

(To be concluded in next issue.)

HYPERLEUKOCYTOSIS IN DIABETIC COMA*

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A MARKED leukocytosis is a frequently observed phenomenon in diabetic coma. Competent observers have agreed that this is not an infectious leukocytosis and is a characteristic of an uncomplicated diabetic coma. There is an apparent correlation between the amounts of acidosis (that is, the acetone, diacetic and B-oxybutyric acid) and the increase of the circulating leukocytes. Joslin[3] reports five cases of marked leukocytosis, the count ranging from 14,000 to 44,100 and without history of infection or hemorrhage from the stomach. Allan[1] likewise has reported five cases in which the leukocytosis ranged from 16,000 to 66,400 uncomplicated by infection. He brings out in his publication the difficulties sometimes observed in the differential diagnosis between diabetic coma and an acute abdominal condition. Klaus Barner[2] reports two cases in which the patients were in coma or precoma, and the blood examinations showed a distinct stimulation of the leukocytes. He found a marked shift to the left (Schilling's method). There was a great relative increase of neutrophils and shifting to myelocytes. He believes that the acetone bodies are probably the cause of the change in the blood.

In one of our cases to be reported, detailed hematologic study showed the response to be in the granulocytic series. Sabin[4] believes that the granulocytes are developed between the sinuses of the bone marrow and migrate into the sinuses when they are dilated. In her concept the oxygen tension in the bone marrow plays a very important part in the dilatation of the sinusoids. It may be that the noxious agent causing the increased circulation of white cells is the acetone bodies in the blood. These bodies may cause a dilatation of the sinuses in the bone marrow, hence, according to the Sabin theory, the increase in the circulating white cells. It is interesting to note that the lymphoctyes and monocytes were not particularly affected. What the relationship is between the age of the patient and the increased circulating white cells is questionable. We know that in youth there is a greater response in the white blood count to stimulation both by bacterial toxin and metabolic products. In the older case to be reported there was no detailed blood study made, but the white cell count reached 24,000 without any evidence of infection.

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CASE REPORTS

Case 1.—Miss C., aged 15, Jewish.

Past History: She has been a diabetic for seven years, and during this time has been in coma three times. A diagnosis of diabetes mellitus was made for the first time during an attack of otitis media complicated by diabetic coma. We have no detailed report concerning the blood in the first attack of coma. She has been studied and followed continuously in the University Dispensary and Hospital from December 28, 1923, to date. During this time her diet was gradually increased until she was receiving carbohydrates 65, protein 55, and fat 150, with insulin 20, 10, 30, 10.

The day before admission the patient was slightly nauseated and did not eat much food and for that reason discontinued her insulin. The next morning a doctor was called who gave her 10 units of insulin. By noon she was nauseated to the extent that she was vomiting and complained of pain in the midepigastrium. She was then referred to the University Hospital.

Physical Examination: On January 23, 1928, the patient was admitted to the University Hospital, presenting the picture of diabetic coma with unusually pronounced and persistent Kussmaul breathing. The patient did not take her evening insulin and that night became nauseated and started to vomit and gradually went into deep coma. The body temperature on admission was 97, pulse 140. The systolic blood pressure varied from 80 to 60 and the diastolic from 30 to 0. Blood pressure gradually increased to systolic 115, diastolic 75. The eyes were soft, skin dry, chest negative. The heart was rapid and irregular, but on treatment became regular. On admission there were a few crepitant râles heard over the bases of both lungs, posteriorly, which did not persist. The abdomen was markedly distended with slight tenderness in the epigastrium. Reflexes were hyperactive. Temperature the first day reached 97 degrees Fahrenheit. The following days the temperature was not observed higher than 100.

Laboratory Examination: The blood showed 600 milligrams of blood sugar per 100 c.c. of blood and the reduction of the CO_2 combining power to 11 volume per cent (Van Slyke). The patient was brought out of coma by the routine procedure, outlined by Joslin. The urine contined a large mount of acetone and diacetic acid, a few red blood cells, and many

granular casts. This gradually cleared up. The Wassermann examination was negative. The blood urea nitrogen 16.

The interest centers around the behavior of the leukocytes. On admission January 23, 1928, white blood cells were 79,000; two hours later 72,000. The next morning, 13,000 and 14,000. Red blood cells were 5,070,000, hemoglobin 97 per cent.

	Blood Sugar	*Van Slyke*	*White Blood Count*
January 23, 10:30 A.M.	.600	11%	79,000
January 23, 4:30 P.M.	.520	15%	72,000
January 24, 8:00 A.M.	.066	32%	24,000
January 24, 2:00 P.M.	.090	40%	
January 25, 8:00 A.M.	.155	43%	14,000

Her diet was gradually increased until she was receiving 60 grams of carbohydrates, 55 protein, 140 fat, and with this she was receiving 70 units of insulin. After twenty-nine days in the hospital she lapsed back to coma due to inactive insulin. The blood sugar on February 27th showed 465 milligrams per 100 c.c. of blood and the reduction of CO_2 combining power to 9 volume per cent (Van Slyke). The patient was again brought out of coma by the same procedure.

Both times with the gradual improvement of the diabetic condition the urine, which was heavily loaded with acetone bodies, gradually cleared up and the white count approached normal.

	Blood Sugar	*Van Slyke*	*White Blood Count*
February 27, 1928	.465	9%	97,000
February 28, 1928	.319	31%	
March 1, 1928	.222	45%	22,000
March 2, 1928	.163	60%	14,000

The following detailed morphological study of the blood at the peak of the leukocyte count (97,000) was made by Dr. C. H. Watkins: The erythrocytes show a moderate anisocytosis, moderate polychromatophilia and an occasional normoblast. The neutrophiles are markedly shifted to the left as far as the leukoblast stage. The predominating cell is the myelocyte although numerous premyelocytes are present. The eosinophiles are likewise immature, most of the cells being in the metamyelocyte stage. The basophiles are increased in number but are, for the most part, mature. The lymphocytes are relatively decreased in number, but show no evidence of immaturity. The monocytes are slightly immature and the cytoplasm contains abundant azurophilic granulation. The blood platelets appear to be increased and are smaller than normal.

After the leukocyte count returned to normal, the morphological blood picture became entirely normal and remained so.

This response in the leukocytes is not present in the young diabetic only, for we have one other case in a patient forty-six years of age who had proportionately the same response. The following illustrates how difficult it often is to make a diagnosis of an acute abdominal infection in diabetic coma. Her cardinal symptoms were nausea, vomiting and pain in the epigastrium with a leukocytic response of 24,000. She was admitted to the University Hospital on two occasions in diabetic coma. The second time she had a definite history of upper respiratory infection, but the first time we were unable to demonstrate the infection. It is for this reason that this case is incorporated in this paper.

Case 2.—Mrs. M., aged 46.

History: She had had no serious illness during her childhood, but at eighteen years of age had an attack of smallpox. At forty-three years of age she had an appendectomy and it was during the routine examination preparing her for this operation that sugar was found in the urine.

The patient was put on a qualitative diet, taking insulin irregularly, usually 15 units daily. On July 3 she went on a weekend party. She became nauseated, had pain in the midepigastrium and then vomited. She then took 15 units of insulin and felt much better. That night her symptoms recurred and in taking her insulin she broke the needle and hence discontinued the use of insulin. She was taken to her home in rather critical condition and her home doctor made a diagnosis of intestinal obstruction. A consultant was called who recognized the condition as diabetic coma and who then referred her to the University Hospital on July 6.

Physical Examination: The patient was a tall, undernourished, white female in severe coma with marked Kussmaul breathing, and marked dehydration. The eyes were soft, tonsils small, neck normal. The lungs were negative, pulse 140, heart regular and within normal limits in size. Blood pressure 88/65. The abdomen was extremely tender in the epigastrium on palpation, but there was no rebound tenderness. Rectal and vaginal examinations were negative. The reflexes were hyperative. The eye-ground findings were negative.

Laboratory Findings: The blood on admission showed 450 mgm. of blood sugar per 100 c.c. of blood and the reduction of the carbon dioxide combining power was 7. Hgb. 100 per cent: r.b.c. 4,960: w.b.c. 24,000; differential p.m.s.s. 80 per cent, lymphocytes 20 per cent; Wassermann negative. Stool examination proved negative. *X*-ray of the extremities showed no calcification of the arteries.

The patient was brought out of coma by the same procedure as above.

	Blood Sugar	*Van Slyke*	*White Blood Count*
July 6th, 10:00 P.M.	.545	7%	24,000
July 6th, 6:00 P. M.	.468	11%	
July 7th, 8:15 A.M.	.078	44%	12,000
July 8th		65%	

She was discharged on a diet of 80 carbohydrates, 50 protein and 180 fat with 40 units of insulin.

A detailed study of the blood was not made in this case.

SUMMARY

1. Two cases of diabetes with coma are reviewed in which there was a definite stimulation of the white blood cells without evidence of infection.

2. This may be explained on the basis of the reaction to organic acids such as beta-oxybutyric acid in high concentration in the blood.

3. The age of the individual might explain the response in the younger individual.

4. Besides the increase of the mature cells of the neutrophilic series there was an increase of the immature cells in the same series to such an extent that the morphological blood picture superficially simulates that of myelogenous leukemia.

CONCLUSION

1. Hyperleukocytosis occurs in diabetic coma.
2. This leukocytosis occurs without a concomitant infection.
3. The leucocytosis may be due to acid bodies.
4. In children the leukocyte count in coma may be higher than in adults.

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THE NAME IS VIOSTEROL

Several preparations of irradiated ergosterol, given for its Vitamin D effect, and christened "Viosterol" by the Council on Pharmacy and Chemistry, are now available on the market. Abroad the product is known by other names, and some distributors are attempting to force the foreign products on the American consumers. Long before anything definite was known as to its actual possibilities for good or harm in the human body, commercial firms attempted, as usual, to get it before the medical profession. When reports of the possible dangers began to appear in foreign medical literature, physicians who were using the product and representatives of the Wisconsin Foundation persuaded the promoters to withdraw the product until dosage and dangers could be established. Then when the time came to release the product again most leading manufacturers agreed to the use of the common name selected by the Council on Pharmacy and Chemistry as the name for the preparations that met its standards. Mead Johnson & Co. of Evansville, Ind., thinking perhaps that its original promotion of its product, Acterol, entitled it to special consideration, has refused to abide by the name chosen by the Council. After careful consideration of all the facts, the Council on Pharmacy and Chemistry decided that the firm had no such claim. Physicians must recognize the necessity for upholding to the fullest extent the Council's decision regarding irradiated ergosterol. If this product is prescribed, the name to be used is "Viosterol" and the brand specified one of those accepted by the Council. Not "Vigantol," not "Acterol," but "Viosterol." (Jour. A. M. A., October 5, 1929, p. 1066.)

MORE MISBRANDED NOSTRUMS

The following products have been the subject of prosecution by the Food, Drug and Insecticide Administration of the United States Department of Agriculture which enforces the Federal Food and Drugs Act: Acid Iron Mineral Compound (A-I-M) (Acid Iron Mineral Percolating Corporation) consisting essentially of a brownish-colored, slightly acid solution of iron, aluminum and magnesium sulphates, with a small amount of phosphates. Allenrhu (Alle-Rhume Remedy Company) consisting essentially of sodium phosphate and sodium sulphate, with small amounts of sodium salicylate and colchicine, some free acid, in a mixture of glycerin and water, flavored with licorice and wintergreen. Nozol (Nozol Company, Inc.) consisting of a heavy petroleum oil, containing menthol and camphor, colored with a red dye. Lane's Cold Tablets (Kemp and Lane, Inc.) consisting essentially of acetanilid, with small amounts of quinine sulphate, camphor and aloin. Asceine (Serra, Garabis and Company) consisting essentially of caffeine, phenacetin (acetphenetidin) and aspirin (acetylsalicylic acid). Zonite (The Zonite Products Company) consisting essentially of a solution of sodium hypochlorite, yielding approximately 1 per cent of available chlorine. Fildrysine (Drug Company) consisting essentially of iodides of potassium and sodium with small amounts of compounds of arsenic and mercury, a trace of berberine, glycerin, alcohol and water. Jayzon's Laxative Cold Tablets (D. C. Leo and Company, Inc.) consisting essentially of acetanilide, with a small amount of cinchona alkaloids and certain extracts of plant drugs, such as aloe, podophyllum and capsicum. (Jour. A. M. A., November 2, 1929, p. 1404.)

THE USE OF SODIUM CHLORIDE IN THE TREATMENT OF VARICOSE VEINS

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THE treatment of varicose veins by the injection method has now practically superseded the older methods of surgical excision. In fact, this method of treatment has been so popularized, especially by Health columns in the daily press, that many sufferers with varicose veins and varicose ulcers are demanding this form of treatment. The injection treatment of veins is becoming so popular that it is absolutely imperative that the medical profession thoroughly acquaint itself with the condition, indications and contra-indications for the treatment, and the technic.

In this treatise we wish to summarize the end-results obtained and the technic used in approximately four hundred injections in eighty cases of varicose veins and varicose ulcers treated since January 1 of this year, and using only one sclerosing agent, namely, 20 per cent sodium chloride solution.

Previous to this time other sclerosing solutions, namely, mercuric chloride, quinine and urea, sodium salicylate, and calorose, were used, but rather aimlessly and without much attempt to follow the results obtained. However, since the first of the year we have kept an accurate account of each case treated, and have systematized our technic, so that it is now much more satisfactory, and we believe the results much more promising.

The injection treatment of varicose veins is by no means a new procedure. It was first introduced in 1851 by Pravatz. In 1894, Delores proved that the results of the treatment were due to the effects of the solution on the intima of the vein rather than to the solution itself. Linzer, Noble and Sicard, on the Continent, have done the most to establish this procedure. In this country, Hayes, and more recently McPheeters, have done much to popularize this method of treatment. Within the past year numerous contributions have been offered.

There are certain types of varices which yield readily to treatment. The isolated varix or the tortuous cavernous mass of varices is ideal for injecting purposes. The small cutaneous dilatations we do not attempt to treat at all. As a rule, they do not cause any symptoms, and the worst that can be said about them is that they are unsightly. We are rather skeptical of those cases where there is a uniform dilatation of the larger trunks of the saphenous vessels. Quite often, especially in men doing heavy work, one finds that all the large superficial veins, not only of the lower limbs but also of the upper extremities, are very prominent. Unless one of these on the lower limb is enlarged out of all proportions it would be better not to attempt obliteration. In two or three cases in which there was a unilateral dilatation of the long saphenous vein, even up to its union with the femoral, a thrombosis has been obtained, but more recently in these cases we have been practising ligation of the saphenous vein at the foramen, with extirpation of the vein to the knee, followed by injections of the tortuous varicosities of the leg. We believe that this is a safer practice, although we do not hesitate to inject either isolated varices or tortuosities on either thigh.

The technic is one which we have established through experience, and one with which we feel we get the best results. In the average case of varicose veins, where the patient is ambulant, one can feel quite certain that the deep venous circulation is competent. We find that it is very seldom that we have to make any special tests to determine the competency of the deep circulation. After a little experience one will get to suspect these cases in taking the history and also on the examination of the limbs. However, if there is any question of the deep circulation it is a simple and safe measure to bind the leg snugly and have the patient walk. If the patient

complains of pain in the leg, injections should not be attempted.

Before the treatment is begun an understanding is had with the patient. It is explained that this will be a course of injections at intervals of three to ten days, and that the treatment will probably extend over a period of from six to twelve weeks.

When the treatment is begun the patient is seated on the end of the table, with the feet resting on a stool. The sites of injection are approximately located. After the tourniquet is applied the patient is asked to lie flat, with the leg elevated even with the body. The site of injection is selected, and this usually the lowermost point of the varices, and the area is sterilized. Then a 20-gauge needle is inserted into the varix, although the size of the needle depends a good deal upon the size of the varix, and blood is then aspirated into the syringe, which usually contains 10 c.c. of the 20 per cent sodium chloride solution. When one ascertains definitely that the needle is in the lumen of the vein, the assistant raises the leg so that it is slightly higher than the body, and after the tourniquet has been released and the veins have collapsed, from 5 to 30 c.c. of the solution are slowly injected, repeatedly making sure that none of the fluid is escaping into the perivascular tissues. Immediately after withdrawing the needle, compression is applied at the site of injection. The leg is maintained in the elevated position. After the cramp subsides (which usually follows each injection, but lasts only a minute or so) a second, or even a third injection may be performed. As a rule, the injections are confined to the varicosities of one leg, and this is continued until the greater part of the vessels are thrombosed before beginning treatment on the other leg. This insures one good leg, as there is usually some discomfort following the development of the thromboses. If 20 to 30 c.c. of the solution are injected at one point this is usually considered sufficient for the day. However, if only 5 or 10 c.c. of solution are injected at one time, three or four of such injections may be completed at one sitting. After the injections are made, a sterile piece of gauze is placed over the points of puncture, and an elastic bandage is applied quite firmly around the extremity, beginning at the foot and continuing to or above the knee, with the leg still in the elevated position. After the bandage is applied the leg is lowered, but the patient is asked to remain quiet for ten or fifteen minutes. The patient is then allowed to be up, and to return home, but is asked to return again in three or four days. Usually at this time, there is quite an extensive thrombosis, which is rather tender, and no more injections are attempted until some of the soreness and pain have subsided.

These treatments are continued then at intervals, gradually working higher and higher on the extremity, until all the varicosities are thrombosed.

In the treatment of varicose ulcers the sclerosing of veins beneath and about the ulcer has usurped all other forms of treatment. This method, combined with immobilization, results in immediate comfort and rapid healing. Frequently there seems to be very little evidence of varicose veins in connection with the ulcer, but careful palpation will almost always disclose veins, either in the bed or at the circumference of the ulcer.

Recurrences of ulcerations are quite certainly due to the fact that some of the varicosities have been missed, and a further search will usually elicit a varix.

The same technic is carried out as described above for the treatment of complicated varices.

After the injection is completed the ulcer is strapped with adhesive, beginning well below and extending well above the ulceration. This is changed every three or four days, and the injections are repeated at intervals, until all the demonstrable varicosities are thrombosed. Almost always, within forty-eight hours after the first treatment, the patient is entirely comfortable and epithelialization can be demonstrated at the margins of the ulcer. Very large ulcers, some half circumscribing the leg, have been healed in this manner.

After healing is complete, the patient is advised to continue to wear a spiral elastic bandage for an indefinite period, merely as a protection and support.

The contra-indications to the injection treatment of veins might be divided into local and constitutional conditions.

The constitutional conditions which might contradict injections are diabetes, marked peripheral arteriosclerosis and pregnancy. In one case, in

the early months of pregnancy, we treated in this manner and got a splendid result, but I believe in general it would be using better judgment to wait until the termination of the pregnancy.

The chief local conditions which might contradict injection are a local infection in an ulceration and a phlebitis. Where infection is present in an ulcer the condition is treated by hot packs until the infection subsides. Where a local phlebitis exists the condition is treated by rest, immobilization, and cold packs. As soon as the phlebitis subsides the remaining varicosities may be injected.

Summarizing the results of four hundred and five injections in eighty-one cases, I have divided the cases into several groups.

In three cases the varicosities had been previously operated and a recurrence developed. Thirteen cases had a complicating varicose ulcer. In twenty-three cases the condition was very extensive, involving both the small and the large saphenous veins. In thirty-six cases there were single groups of nodular varices, and in nine cases a single varix. In every case a good result was obtained, and the patient was well satisfied with the result. In a few cases, especially of the milder types, results were excellent.

This method of treatment, using sodium chloride as the sclerosing agent, is not without its complications. In nine there was quite a marked induration at the site of injection. This complication is undoubtedly due to leakage of the solution through the puncture in the vein wall or due to the fact that the varix is very large and superficial. We have been able to avoid this complication by entering the needle in the skin at a distance from the varix, and traversing quite a thickness of subcutaneous tissue before entering the vein, much in the manner of aspirating a cold abscess.

Six cases developed a marked chemical phlebitis. This was so extensive as to cause a good deal of discomfort. Much of this can be alleviated by rest and the application of cold compresses.

In eleven cases there was some sloughing at the site of injection. In the majority of these cases it was merely a dry slough, which gradually separated and healed over. With experience we have been able to avoid this complication by being absolutely sure of having the needle within the vein. If there is any question the needle is withdrawn without injecting any of the solution. I find that by placing the forefinger of my left hand gently over the point of my needle I can absolutely determine whether the solution is entering the vein or not. When this complication does arise it is evident in a minute, as demonstrable by the blanched appearance of the skin and the bluish-purple irregular border. We feel that it is not a good practice to immediately excise this area. There will be a stinging, burning pain at the site for a period of twenty-four hours, and this will be followed by the development of a dry gangrene, which gradually separates, and the defect slowly fills in with granulation tissue. The immediate injection of the area with hypotonic saline solution is suggested if such an accident should occur.

CONCLUSION

The experiences, the results obtained, and the technic used in four hundred and five injections in eighty-one cases of varicose veins and varicose ulcers, using a 20 per cent sodium chloride solution as the sclerosing agent, are reported.

This sclerosing solution produces a more adherent and extensive thrombosis, giving a more satisfactory end-result. The objections to its use are, first, that it produces a sloughing if allowed to escape outside of the vein wall, and, secondly, that in the majority of the cases it produces a severe cramping pain, which lasts from one to two minutes following injection.

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RHEUMATIC FEVER: A COMMUNICABLE DISEASE*

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DURING the past year there have been eleven cases of acute rheumatic fever among students on the University of Minnesota campus. Five of these were among Farm School students on the Agricultural campus and six among University students on the main campus. All cases occurred within a relatively short period of time, constituting a mild epidemic of this disease. A brief review of the literature shows that epidemics of this kind are not uncommon and each outbreak presents points of clinical and epidemiological interest. This paper is presented particularly from the epidemiological viewpoint.

In order to increase the size of the series and to get more data, a review of cases in students since 1922 is also presented. In all there are thirty-two cases presented here. These were studied in two separate groups for there were more data available from the recent epidemic; but, in summarizing the results, all will be considered together.

CLINICAL AND EPIDEMIOLOGICAL DATA

The age incidence varied from thirteen to thirty-one years, the average being twenty years. There were twenty-nine males and three females. The time in the infirmary varied from 1 to 97 days, the average being about 22 days. These figures, however, do not represent the total duration of disability, as a number of the patients were sent to their homes or transferred to other hospitals. This applies particularly to those who spent only a few days in the infirmary. Four gave a previous history of rheumatic fever.

Fifteen cases occurred among Farm School students on the Agricultural campus and four among Agricultural College students on the same campus. Thirteen cases occurred among all other colleges on the main University campus. These data seem significant, as the Agriculture group forms less than ten per cent of the total University enrollment. This was probably due to several factors. The health habits of this group as a whole are not as good as in the larger University group. More foci of infection are present. Also, this group, coming largely from rural districts, have had fewer previous contacts and less chance for immunity, and on coming to school have a greater degree of segregation and closer contacts due to the fact that most of them live in dormitories, whereas the larger University group live almost entirely in private homes.

The actual clinical course and treatment will not be considered here. Clinically, all of these cases were typical acute rheumatic fever, with or without complications. Treatment was under the supervision of a competent internist, and according to usual prescribed methods. There was one death in the series.

A search for foci of infection was made in each case. In ten cases no focus could be found. In the cases in which foci were found, the tonsils were the probable foci in nineteen cases, teeth in four cases, sinuses in four cases, and osteomyelitis possibly in one case.

Thirteen cases were uncomplicated rheumatic fever. Of the nineteen cases with complications, endocarditis was the complicating factor in fifteen, endocarditis and pericarditis in two, pericarditis alone in one, bronchopneumonia in three, pleurisy in one, acute glomerulo-nephritis in one and old mitral regurgitation in one case.

Thirteen cases were admitted to the infirmary for some other illness a short time before developing rheumatic fever. Some of these may have been a forerunner of or may have initiated the attack. Of these thirteen, seven were in with tonsilitis, four with respiratory infections, one with maxillary sinusitis; and one for submucous resection.

Twenty-seven of the thirty-two cases occurred during the month of January, February, March and April. There were two cases in May, one in June and two in November. These data correspond with those of some of the other series reported in the literature, most epidemics occurring in the early months of the year.

In the five cases occurring among Farm

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School students this year, it was possible to establish contact with known cases of rheumatic fever in each instance. No great significance can be attached to this, however, as there are too few cases from which to draw definite conclusions.

DISCUSSION

A partial review of the literature on the epidemiology of rheumatic fever has been made to bring out more strongly the facts presented in this series. The following points are those of most interest in this relation.

1. *Communicability.*—As early as 1864, Hirsch in his Geographical and Historical Pathology states that "rheumatic fever deserves an assured place among acute infectious diseases." Newsholme in 1895 made an exhaustive study of the known facts and expressed the belief that "rheumatic fever was a specific febrile disease always endemic and at intervals epidemic or even pandemic." Numerous others since that time have studied this problem. Fairly recent articles have been published by Hiller and Graef, Atwater, Mackie, Abeloff and Sabel, Boas and Swartz and others. The general conclusion reached is that rheumatic fever has many of the characteristics of other infectious diseases with a low grade of contagiousness but that at times and under special circumstances it may assume epidemic proportions. Fiessinger, Friedlander, Miller, Swift and others give studies pointing to the possibility that house infections, especially where crowding and unhygienic conditions are important factors, occur in rheumatic fever. Cheadle, Branson, MacCullun, Mantle, Ingerman and Wilson present studies showing the high family incidence. Abeloff and Sabel, Faulkner and White also show that rheumatic fever, like tuberculosis, is to a considerable extent a familial disease, their conclusions from the evidence presented being that families of "rheumatic" patients are more than twice as apt to have another member with a rheumatic infection as families of "non-rheumatic" persons. St. Lawrence observes a higher family incidence for rheumatic fever than for tuberculosis.

In the series presented here the higher incidence in the more closely segregated group of Agricultural students points strongly to the assumption that communicability must have been an important factor. Actual contact with known cases could be demonstrated in almost half of the 1929 cases.

2. *Focal Infection.*—Focal infection in rheumatic fever is still a debatable question. Many prefer that the phrase "portal of entry" be used in its place as it expresses better the real situation. The literature is replete with writings on this subject so only a few will be quoted. Marshall, Houston, Miller, Mackie and many others stress the tonsils as foci of infection. Shaw, Hartzell and others show the importance of oral infections other than the tonsils. Several authors have called attention to other more uncommon foci. Kaiser studied 48,000 children, 28,000 in whom tonsils were removed and 20,000 in whom they were not removed, and concluded that the tonsillectomized child is insured somewhat greater protection against this infection. Ingerman and Wilson believe that tonsillectomy does not by any means always protect against infection, but that other portals of entry must be considered.

In this series tonsillitis in a number of cases and sinusitis in a few cases initiated the attack and were considered as probable portals of entry. In a number of other cases tonsils or teeth were considered to act as foci of infection.

3. *Seasonal Variations.*—A number of the writers previously quoted have called attention to the seasonal occurrence of rheumatic disease. In some localities it is of more frequent occurrence in the spring, while in others it is more common in the fall. In general, the months of March, April and May seem to be the most common.

The early months of the year, January, February, March and April, are evidently the most common in this locality, judging from the material presented.

4. *Age.*—Age incidence is given in almost all of the articles reviewed. Rheumatic fever may occur at almost any age, and is quite common in children, but the highest incidence is given for the ages from ten to twenty.

This age group takes in all of the cases presented in this series.

5. *Geographical Distribution.* — Harrison, Shaw, Clark and others show that this disease is comparatively common in the colder climates and comparatively uncommon in warmer climates, being rare in the tropics.

The climate in this locality seems to be a fairly favorable one for this disease.

6. *Relation to Rainfall.*—A number of writers both in this country and in the British Isles have shown that there is an increased incidence and a higher death rate during the years or months when there is a large rainfall. Several authors have called attention to the fact that rheumatic fever is most common in the British Isles when dampness is common. These facts are interesting but bear no apparent relation to the present series.

7. *Etiology.*—The bacterium which causes rheumatic fever is still a debatable question, both a streptococcus and a diplococcus having been described. Blood cultures were made on three students in the 1929 group by Dr. W. P. Larson of the Bacteriology department of the Medical School. The first two cultures were negative, possibly because they were not taken early enough in the course of the disease. In the third a gram-positive diplococcus was found, which would grow only on yeast extract broth.

SUMMARY AND CONCLUSIONS

1. Thirty-two cases of acute rheumatic fever among students at the University of Minnesota are presented.

2. Nineteen cases or 60 per cent occurred among the relatively small segregated group of students on the Agricultural campus, which comprise less than 10 per cent of the University enrollment.

3. Foci of infection were found in twenty-two cases or 69 per cent.

4. Complications occurred in eighteen or 56 per cent.

5. Twenty-seven cases or 85 per cent occurred during the months of January, February, March, and April.

6. Rheumatic fever is a communicable disease, and seasonal epidemics are not uncommon.

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THE D. A. WILLIAMS QUACKERY

The Dr. D. A. Williams Company of East Hampton, Conn., has been operating a piece of mail-order quackery for many years. More than ten years ago the Bureau of Investigation of the American Medical Association reviewed the history of the concern and brought out that the business had become so extensive that it had given the little village of East Hampton, with a population of less than 1,500 people, a postoffice of the second class! At the time, form-letters sent out by the D. A. Williams concern were signed, variously, "Theodore Flaacks, President," "J. M. Stearns, Manager," and, occasionally, "Dr. E. E. Williams, Medical Advisor." It was also shown that the Dr. D. A. Williams concern had made a practice of selling to letter-brokers the original letters that had been sent to it by prospective victims. It was shown, too, that the preparation sent out by the company for the alleged cure of all "uric acid troubles" was essentially a solution of potassium acetate, colored and flavored with wintergreen. Examination of a specimen sent out by the D. A. Williams concern in October, 1929, indicates that the composition of the nostrum has not changed. Recently the National Better Business Bureau investigated the concern. With the assistance of the Medical Information Bureau of the New York Academy of Medicine, four report blanks were filled out and sent to the Williams Company from different parts of the country to determine whether the company declined to sell its product to those who were suffering from serious ailments. Due to the fact that diagnosis by mail is declared to be unscientific and untrustworthy by medical authorities, pronounced symptoms were indicated. In reply a diagnosis and prescription were returned under the signature of Dr. Wilson Powell, New Haven, Conn. (Jour. A. M. A., November 9, 1929, p. 1493.)

BOROCAINE NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that under the proprietary, non-descriptive name "Borocaine," Sharp & Dohme, Baltimore, market procaine borate, the boric acid salt of the base procaine. The product was placed on the market on the basis of work published by Copeland and Notton, who adopted the name Borocaine to designate the borates of various anesthetic bases with which they experimented and who, according to Sharp & Dohme, gave their approval to the British Drug Houses to manufacture procaine borate under the tile Borocaine. The A. M. A. Chemical Laboratory examined the product marketed as Borocaine and reported that it was the borate of the base procaine —that is, procaine borate. From a study of the literature it was concluded that the procaine borate studied by Copeland and Notton agreed essentially in composition with the procaine borate prepared and described in 1910 by Einhorn and Uhlfelder. Since procaine borate was previously described in the literature, the Council could not recognize the name Borocaine on the score of novelty, and since neither Sharp & Dohme, the British Drug Houses nor Copeland and Notton discovered the therapeutic value of procaine or even the properties of procaine when contained in a solution in which ionization of the procaine salt does not accur, the Council could not recognize the name Borocaine under the clause which permits the recognition of a proprietary name for a previously known substance discovered to have therapeutic value. The Council therefore declared "Borocaine" unacceptable for New and Non-official Remedies because the application of a proprietary name to procaine borate is considered not to be in the interest of rational therapy. (Jour. A. M. A., October 26, 1929, p. 1309.)

CAREFUL OBSTETRICS

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I SELECTED this title, "Careful Obstetrics" because there has been in recent years a renewed interest in maternal and infant welfare and that interest must be maintained by us through reiteration of the principles involved.

The necessity of better obstetric care is shown by the facts that approximately seven in every 1,000 pregnant women die (20,000 die yearly in the United States alone), some 100,000 babies die yearly under the age of one month and every year there occur 100,000 stillbirths. In addition puerperal morbidity due to parturitional injuries, puerperal infection and post-partem hemorrhage often leaves its dire impress in the form of chronic invalidism of the mother. Trauma to the infant, if not sufficient to cause death, often produces permanent defects.

It is generally agreed that the present high mortality and morbidity can be greatly reduced by proper prenatal, natal, and postnatal care. Our greatest advance is shown in lessened morbidity, but fetal and maternal mortality has changed too little during the last twenty-five years.

What factors are responsible for this condition? There is a lack of education of the laity as to what constitutes proper obstetric care. The state as well as the physician should be responsible for the dissemination of this knowledge. Midwifery is still a factor but a constantly decreasing one. There is a great need for better undergraduate and postgraduate instruction and a renewed sense of responsibility by the physician who accepts an obstetric case, thus raising the practice of obstetrics to the dignity of an art, not a sideline in the practice of medicine. Too often there is the feeling that the majority of cases will terminate happily without any attention whatsoever except to be present at labor to tie the cord and Credé the placenta or possibly to end the case abruptly by the inpudicious use of pituitrin or forceps. With present-day ease of communication and transportation, the problem of the rural physician is not different from that of the urban physician. One can practice better obstetrics if there is the will to do it. The only problem is proper remuneration and this is a matter for your medical society to discuss and agree upon.

The best single argument for pre-natal care is the expression of Moreceau, "that pregnancy is a disease of nine months duration." We know that very few women pass through the pregnant state without some disturbance more or less momentous, either physical or psychical. Assuming that the physiologic processes of a normal woman should make proper adjustments to the pregnant state, the majority of women suffer during this attempt with such disturbances as malaise, nervous instability, nausea and vomiting, or exhibit evidence of great physiologic load, by acidosis, glycosuria and albuminuria.

Again her reaction to the pregnant state often results in such marked imbalance as to produce a serious condition such as pernicious vomiting, nephritic or pre-eclamptic toxemia, or true eclampsia.

Prenatal care will disclose these conditions at their inception and with proper treatment will effect a cure in most instances.

The first principle of prenatal care is a careful history. Tuberculosis, insanity, cancer, hemophilia, in the family history is important. Barnes said, "Pregnancy is a test of bodily soundness." Previous diseases may markedly influence the pregnancy, parturition or puerperium. Who has not seen the rickety pelvis, with consequent dystocia; the heart damaged by some infectious disease such as diphtheria, influenza, or articular rheumatism undergo decompensation under the stress of labor; the deleterious effect of pregnancy on tuberculosis which flares up in the puerperium; a chronic nephritis which progresses to a pronounced insufficiency through a toxemia, usually at the end of the second trimester? These cases require the most meticulous care and fine judgment in their treatment.

A history of previous gynecologic operations

*Read at the sixty-first annual meeting of the Wabasha County Medical Society, Wabasha, Minnesota, July 11, 1929.

may be important as to probable complications. The woman who has had an anterior fixation of the uterus is faced with the possibility of miscarriage or dystocia; the one with an amputated cervix with prematurity or dystocia. The one with the over-corrected rectocele may require an episiotomy to prevent laceration into the rectum or fetal death from intracranial hemorrhage, due to pounding of the head on the pelvic floor; the one who has had a previous cesarean section is likely to require at least the new low, extraperitoneal operation.

The venereal question should be put and the presence of infection determined by laboratory tests. Rarely does one find a smear positive for gonorrhea, but stigmata such as infected Skene or Bartholine glands or the so-called gonorrheal macule at the orifice of the latter, are sufficient evidence that the disease exists, and indicate the necessity for energetic treatment. The results from antisyphilitic preparations are next to marvelous in pregnancy.

The history of previous pregnancies as to duration, termination, type of labor, ante-natal and post-natal complications are important. Parturitional accidents such as premature separation of placenta, retained placenta, post-partum hemorrhage often recur and with this information in mind one can be on guard.

Minor symptoms such as nausea and vomiting which 50 per cent of pregnant women have more or less should be all noted. Many women consider this as a normal phenomenon, but if neglected it may develop into a pernicious form. Intravenous glucose with or without insulin prevents many therapeutic abortions which formerly had been necessary to preserve the health or life of the mother.

Symptoms such as headache, blurred vision, and epigastric pain should be investigated. Occurring in the last trimester these complaints have a special significance and may indicate an impending eclampsia. Infections of the nose and throat and particularly of the sinuses is a frequent cause of puerperal sepsis. Caries of the teeth indicate faulty calcium metabolism, which may be corrected by cod-liver oil and sunlight, or alpine lamp. It is now believed that the calcium metabolism at this time has a great influence upon the eruption and development of the child's teeth.

A thorough physical examination is due every pregnant woman. Foci of infection should be discovered and eliminated as far as possible. Thyroid enlargement may require treatment. Tuberculosis healed or active may require therapeutic abortion. Cardiac disease is an indication for constant vigilance and treatment and may require therapeutic abortion or, if seen late in pregnancy, cesarean section under local anesthesia. Bimanual examination in the early months may reveal a retroversion which if not corrected spontaneously or manually might become incarcerated and result in an abortion and sepsis. Tumors of the uterus of ovaries may be found. Varicosities of the extremities, aside from their unsightliness, produce aching legs and invite thrombophlebitis during the puerperal period. Elevated blood pressure, taking 130 as the upper limit of normal, points toward a developing toxemia even before albuminuria is present.

The average physician will not take pelvic measurements. There is no excuse for the neglect of such a simple but informative procedure.

The determination of the presentation and position of the fetus during the last trimester will at times allow a malposition to be corrected before labor.

Finally the mother should be supplied with information such as is given in the pamphlet, "Prenatal Care," furnished by the U. S. Department of Labor, which gives her information in simple terms regarding hygiene suitable for the pregnant state and in addition information concerning the care of the baby.

The patient should visit her physician every three weeks for the first six months, every two weeks thereafter, furnishing a specimen of urine every week during the last six weeks. At these visits, weight should be recorded, adverse symptoms noted, blood pressure readings taken, urine examination made and the condition of the fetus ascertained.

Only by proper prenatal care can many of the complications of childbirth be prevented. Our greatest opportunity lies in the prevention of fetal deaths, 34 per cent of which are due to syphilis and 72 per cent to syphilis, dystocia, toxemia and prematurity in the order named. Polak says, "Conscientious pre-natal care could obviate the death of one-half of the children who now die within the first month of puerperium." If so, 50,000 children are needlessly sacrificed each year.

Adequate care during labor is not often obtained. This is due to many causes: economic, the exigencies of medical practice, insufficient training, the personal equation involving conscientiousness, skill and niceties of judgment. Obstetrics is the poorest paid portion of medical practice, but it should be and is the most gratifying. Many obstetricians claim that obstetrics is a surgical specialty. While it is true that surgical efficiency is a necessary qualification of a good obstetrician, the bulk of obstetrics will always be done by the general practitioner. His dearth of surgical ability can be offset by conscientious effort with the skill that he possesses.

The one greatest need of the woman to be confined is her share of our time—the very thing we have the least of. There is no comparison between the results obtained by "hit and run" obstetrics and that obtained by adequate supervision.

The woman in labor and the fetus are beset with dangers more fulminating and immediate than the acute surgical case.

In the conduct of labor lies our greatest opportunity to change the existing figures of morbidity and mortality of the mother and child. Here the information gained by the prenatal care becomes valuable especially with regard to the blood, heart, lungs, kidneys and bony pelvis. Often we can predict the complications likely to arise in a particular case and be prepared to meet them. By observing the character of the contractions we can stop ineffectual ones by morphin, stimulate them by pituitrin or control them by anesthesia, of course giving due consideration to the stage of labor and anomalies of the child, passages and bony pelvis. The first essential is to know the position of the fetus. This is obtained by abdominal palpation and confirmed by rectal examination. The condition of the fetus should be noted at regular intervals particularly during the second stage. Rectal examination is a most satisfying diagnostic procedure and will eliminate vaginal examinations in 80 per cent of labors. With it can be determined the presence or absence of engagement, the condition of the cervix, the amount of forewaters and progress of labor.

Rigid asepsis should be maintained, as puerperal infection is the greatest cause of maternal morbidity and mortality. The parturient tract may be considered as an open wound and sepsis as a wound infection. Vaginal examinations, injudicious use of forceps, ill-advised intra-uterine manipulation, the fads of obstetrics, such as Potter's version and early forceps, help to maintain that 40 per cent of maternal deaths which are due to infection.

"More women die from accidents of the third stage than the other two combined." Post-partum hemorrhage is a fearful emergency. It may be insidious or acute and requires watchfulness, accurate estimation of blood loss, quick judgment and energetic treatment. The placenta should be given time to separate, should be Credéd gently, and examined thoroughly. Retention of a piece of placenta often produces sepsis and retention of membranes, sapremia and prolonged convalescence.

Strenuous methods in the resuscitation of the child should be avoided. Usually the child does not get his share of post-natal attention. The fact that as many children die in the first month as in the next eleven months deserve our consideration. Deaths are sometimes due to an enlarged thymus, which is remediable, or to congenital heart, which, while not curable, brings humiliation if not diagnosed.

The post-natal comfort of the mother is often neglected. Aseptic technic should be continued and applied to the breasts, treating fissures which if persistent may result in breast abscess. Persistent lochia rubra and frank hemorrhage should be controlled. Every effort should be made to locate the source of any fever and the perineal repair should be inspected.

Obstetrics, which should be an art, is a neglected branch of medicine both in its teaching and its practice. Education of the laity as to the value of pre-natal care, more undergraduate and postgraduate instruction, and conscientious usage of the knowledge that the practising physician now possesses will prevent a large percentage of the cases resulting in chronic invalidism and untimely death.

609 LaSalle Bldg.

CASE REPORTS

ULCUS RODENS OF RIGHT EYE TREATED BY A CONJUNCTIVAL FLAP OPERATION

REPORT OF CASE

ARTHUR C. DEAN, M.D., F.A.C.S.
Hot Springs Clinic
Hot Springs, South Dakota

De Schweinitz describes ulcus rodens or chronic serpiginous ulcer of the cornea, as it is sometimes called, as a creeping ulcer which begins usually at the upper edge of the cornea as a superficial lesion separated from the healthy portion by a gray, opaque rim, which is usually undermined. The deeply undermined conjunctival edge of the ulcer is a striking feature. Vessels may pass to this ulcer and cicatrization apparently begin, but it relapses quickly and may spread until the whole cornea is traversed and sight is destroyed. The cornea is not usually perforated. The process may last from two to ten months or longer. The etiological factor has not been determined. The involvement seems to be limited, almost always, to the superficial layers of the cornea, according to Feingald. Prognosis is unfavorable. The treatment consists of relief of the pain and photophobia. The use of atropine and dionin, antiseptic Collyria in the cul-de-sac, hot compresses, or powdered calomel is indicated, and even paracentesis, curettage, conjunctival flaps, foreign protein injections, etc., may be resorted to if the earlier measures fail. Any evidence of focal infection in the teeth, tonsils, or sinuses should be attended to.

Fig. 1. Appearance of the eye on admission.

CASE REPORT

Mrs. E. F. came into the office on June 14, 1928, complaining of a soreness and redness of the right eye, which had become progressively worse for the past

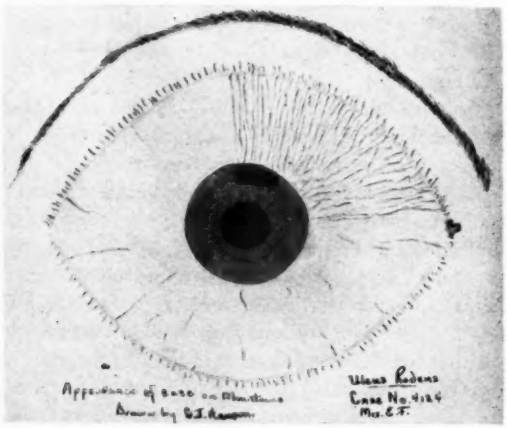


Fig. 2. Schematic drawing of the condition of the eye on admission.

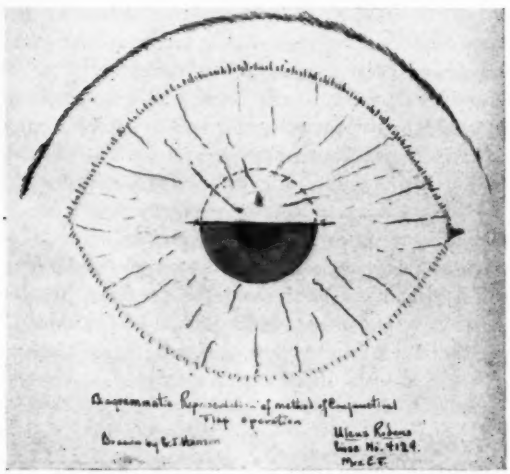


Fig. 3. Diagrammatic representation of the method used in the conjunctival flap operation.

four weeks. She had been treated by her local physician without any improvement. There was edema and ptosis of the right lid, marked lacrymation and photophobia. The right pupil was irregular and partly dilated. The tension was not increased. The vision was: right eye 20/200, left eye 20/20. There was an ulcer near the limbus in the eleven to one o'clock portion extending four millimeters towards the center of the cornea. The edges of this ulcer were undermined and the floor presented a dirty, scooped-out appearance. There were new blood vessels extending from the conjunctival edge and the ocular conjunctiva was injected over a triangular area with the ulcer as an apex. There was a mottling of Descemet's membrane and the iris was of a dirty, grayish appearance. The cornea was hazy, and the view of the fundus was indistinct.

General examination revealed no abnormalities. The patient was four months pregnant, the urine and blood were normal. The blood Wassermann was negative. *X*-ray of sinuses showed a very low grade chronic ethmoiditis. Teeth and tonsils were not diseased. Eye culture was positive for staphylococcus and pneumococcus. The patient was hospitalized and atropine instilled into the eye. Hot compresses were used and the ulcer was curretted. Calomel was applied to the ulcer locally. Boiled milk was injected into the gluteal muscles until a good reaction was obtained.

This treatment was continued six weeks and the eye did not show the expected improvement. For this reason it was decided to do a conjunctival flap operation. The method of Kuhnt was used as illustrated in the accompanying diagram. The flap was left in place five days and then removed. The ulcer healed rapidly from that time on, and three weeks later the patient was discharged with 20/30 vision in the right eye.

POPLITEAL ANEURYSM

REPORT OF CASE

A. E. Olson, M.D.
Duluth, Minnesota

The patient, G. E., seventy-four years of age, had been ill acutely four days before coming under our care.

Present Complaint.—

1. Pain, sudden and severe in left knee and leg.
2. Coldness and numbness of left extremity below the knee.
3. Swelling and discoloration of left leg.

Onset and Course.—The patient had noticed a pecular heavy lagging sensation in the left leg for the past year. He had not given this any particular attention because he did not have distress or pain and had worked as usual.

On June 12, 1929, he made a long trip by auto, driving almost continuously fourteen hours. On arriving at his destination, he stepped from the car and was suddenly seized with a very intense pain in the left leg from the knee down. He buckled and fell to the ground. The pain continued for three hours and was so severe that he was completely exhausted. The leg then became cold and lifeless. The next day hot packs were applied, the leg swelled, the skin blistered and the tissues turned black and blue below an area extending from the middle of the thigh. A physician was called and a tight bandage was applied covering the whole area. The patient returned to Duluth and entered the hospital on June 16, four days after the onset.

Past History.—The patient had never been sick and had not previously consulted a physician, although he had marked hemorrhoids and an almost complete prolapse of the rectum when first examined.

Examination.—The patient when first seen by me seemed very ill. He was weak and irrational at times. He was quite well nourished. The pulse was 88, temperature 100.2, respirations 20, blood pressure 128/94.

General examination was negative except for the rectal condition mentioned above. The essential pathology centered in the left leg below the knee and extending to the middle of the thigh. The limb below this area was markedly edematous and was blue-black in color. There was superficial sloughing of the skin. There was complete loss of sensation and a motor paralysis in the involved area. No vascular pulsation was noted except in the upper third of thigh.

Treatment.—Preoperatively, this was supportive and included a blood transfusion. A high thigh amputation was performed on June 20, eight days after the onset. Spinal anesthesia was used and outside of another transfusion, the postoperative treatment and course were uneventful.

Pathological Report.—"A fusiform aneurysm of the popliteal artery, measuring 3.2 cm. in diameter and 9 cm. in length. It involved a general dilatation of all the coats of the vessel and all visible orifices of collateral or other branches were obliterated.

"On dissection, the femoral artery for a distance of 16 cm. above the popliteal space contains a friable clot. The walls are markedly thickened and sclerosed. The intima is broken in several places. The sac is filled with a clot organized at the periphery, gray in color. Through its center there is a dark reddish-brown clot, apparently more recent and filling a canalized tube.

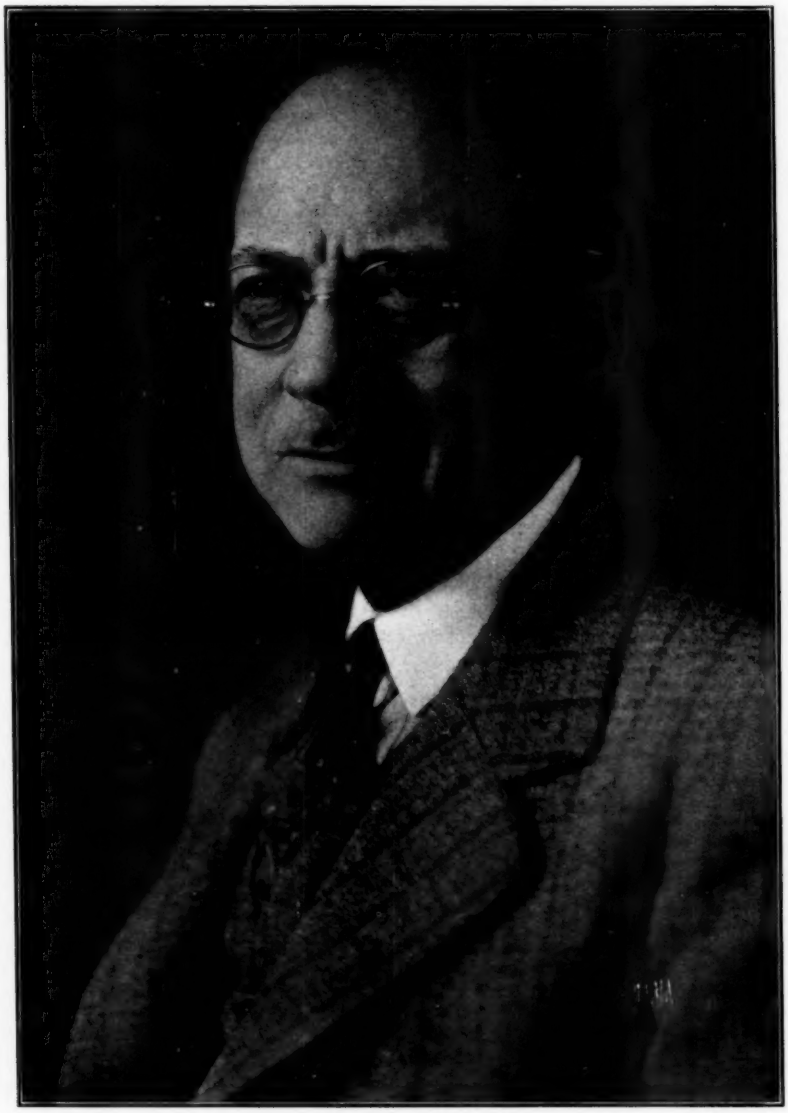
"Over the lower two-thirds of the sac, the intima and part of the media is dissected away and peels off with the clot. The wall of the sac measures as much as .6 cm. in thickness. The femoral and popliteal divisions of the vein are closely attached to the aneurysm by dense adhesions. The vessels are all thrombosed in the involved region."

Diagnosis.—Popliteal aneurism with thrombosis.

The possibility of cure, had the patient sought treatment earlier, is doubtful. The blood Wassermann was negative. In this type of fusiform aneurysm only obliterative aneurysmorrhaphy can be performed where the walls are so degenerated (Matas operation). It is improbable that collateral circulation could then be established.

SUMMARY

This case is of interest because the symptoms of the onset were those of an embolus causing complete and immediate obstruction in the popliteal artery. Also, the patient, seventy-four years old, with the usual senile changes, recovered from high amputation of the thigh under spinal anesthesia, an operation which entails considerable shock.



S. H. Boyer, M.D.
President, Minnesota State Medical Association

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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Vol. XIII January, 1930 No. 1

OPINION CONCERNING SAFETY OF SPINAL ANALGESIA

The feasibility of spinal analgesia in surgery was suggested by Corning in 1885 and the first practical application of the method was made by Bier, of Kiel, in 1899. These facts are well known now. Considering the time that has passed since the pioneer work, however, one might expect, concerning the value of spinal analgesia, more unity of attitude among surgeons than seems to exist.

Lundy, whose attitude toward the method has been conservative, writes as follows: "With the close of 1928 it seemed that the severity of the untoward reaction which had been observed previously in spinal anesthesia had decreased, as had the frequency of such reactions, so that the problem which gives the most concern now is that of increasing the period of anesthesia and of retaining safety."

Insufficient duration of analgesic effect is a serious fault, certainly. According to Labat, "one hour is the average time available for operation." Nevertheless, some internationally known surgeons, whose work consists mainly of pelvic operations which they perform as a routine in less than a hour, will not employ spinal analgesia. The reason, perhaps, is that the memory of previous untoward reactions has remained with them and they are not convinced of the safety of the method. Their experience and the responsibility they carry make their opinion worthy of respect. Many anesthetists, however, believe these surgeons to be wrong and they have worked out a number of safeguards which undoubtedly have reduced the hazard.

First of these, in the minds of some, is the experience of the person who administers the anesthetic and whose special care it is, throughout the operation and after the patient has returned to bed, to see that the anesthetic does no harm. More emphasis is placed on experience with some method than on the use of any particular method.

Selection of the drug to be injected has been narrowed considerably by recent experience. Procaine has been widely accepted as having the minimum of toxic effect. Moreover, with the knowledge that has been acquired concerning the use of barbiturates in combating the toxicity of procaine, particularly concerning the use of isoamylethyl barbituric acid, an added factor of safety is at hand.

In the method of injection are factors of danger or of safety. A needle of medium gauge, preferably of nickel, with a short bevel and with an accurately fitting stylet is used. Formerly, spinal fluid was withdrawn before the analgesic solution was injected. At present, only enough

fluid is taken to dissolve the drug that is used. The injection is made slowly, under only light pressure; in this way diffusion of the solution is prevented and the analgesia is better localized.

Of supreme importance is the position of the patient after the injection has been made. The patient should be placed in the Trendelenburg position and should be kept there for at least three hours after he has been returned to bed. With the head lower than the pelvis cerebral anemia is diminished, and it has been claimed that acute cerebral anemia, rather than diffusion of the analgesic to the respiratory center, is the cause of death during spinal analgesia.

The blood pressure tends to fall in spinal analgesia. Formerly, injection of caffein and strychnine tended to combat this. At present, ephedrine is used with better effect. Lundy is convinced of the value of inhalation of oxygen and of pulmonary ventilation in combating anoxemia, and, in 1928, he reiterated his former statement, "If anoxemia is avoided, death under spinal anesthesia may be prevented."

Now that these factors of safety have come into use and that attention is being directed to retaining safety and to lengthening the period of analgesia, it will be interesting to watch statistics from medical centers of the next few years to see if the proportion of operations under spinal analgesia increases.

R. M. Hewitt, M.D.

SUGGESTED CRIME

Some two years ago the writer commented in these columns upon the contagion of suicide; the serious menace of repeated suggestion lent emotionally unstable folk by the appearance in our news sheets of minute details of suicides, their motives, methods and sequences. A notably conspicuous and ghastly double tragedy has occurred in our vicinity recently, supporting the same contention. Within a few weeks press dispatches from France featured a very unusual trial: an instance of matricide, in which the son shot his mother because of her age, suffering and incurability. A French jury set him free. These accounts were not only featured in the papers, but they were followed up by a series of interviews with notables in various countries, securing expressions of approval or disapproval. Suffice it to say that the jury had enough distinguished support from those who would likewise yield to the young man "the position of judge, jury and executioner"—not to mention temporal control of the divine spark of life—so that they need not have felt lonely on their emotional island.

Thanks to our amazing knitting together of the world, and our ever increasing interdependence, it is difficult to dissociate these newspaper accounts from the northern Minnesota sequel. In brief, it was the shooting to death of a seventeen-year-old victim of a devastating birth palsy —with all its succeeding faulty developments— and the suiciding of an overwrought father. The details can easily be surmised—a helpless child—a thoughtful, indulgent and provident father—a search for causes, remedies, or reasons back of it all—result, futility.

And yet, there were two other lovely children in the family, and a little city full of their equals; why so little glory in the fulfillment of the many because of the grief for the blighted one!

The curtain usually drawn over such a glimpse of the awful potentiality of the human consciousness is that such an act was the result of an unsound mind. The medical opinion will vary, but for the most part it would be a negative one. The irrational mind does not deliver so much courage. It is said that each of us is a personality mosaic, made up out of all our life contacts. These are no longer unit affairs, man to man; the printing press and a thousand agents designed to keep it busy have multiplied the complexity of this mosaic. The press will publish that which is news—always. To those behind the press—who obviously believe so wholeheartedly in advertising and repetition—why is so much repetition used in these suicidal and homicidal stories? Did you notice that recently a long viaduct near Los Angeles was patrolled to prevent an epidemic of jumpers after one had shown the way?

E. L. T.

HISTORICAL COMMITTEE

Medical men have often done many things outside their profession. Many have abandoned medicine for business, some have written poetry and others have entered politics and what not. Who was the President of the United States who studied medicine? Since no president of the United States, so far as I know, ever lived in

Minnesota, you will not find anything about this in our forthcoming book.

To return to the original subject—the man I have in mind entered the army after practising medicine for twenty years, as a Captain of Infantry; was discharged from the service as Brigadier General and then resumed the practice of medicine and followed it for twenty-one years longer.

When your History of Medicine in Minnesota is completed, you may read about him and many others who served in the civil war. Please forward to Dr. Workman whatever scraps of Minnesota Medical history you may be able to supply.

J. M. A.

MISCELLANEOUS

UNLICENSED CANCER SPECIALIST CONVICTED OF PRACTISING HEALING WITHOUT A BASIC SCIENCE CERTIFICATE

Boyd T. Williams, owner and operator of a Cancer Sanatorium, at 525 University Avenue S. E., Minneapolis, Minnesota, was convicted October 31, 1929, by a jury in the District Court of Hennepin County, on a charge of practising healing without a Basic Science Certificate. The evidence showed that on or about September 11, 1928, one Mrs. Sophie Weisskirch was operated on at the Williams' Sanatorium for the removal of an alleged cancerous right breast. The evidence showed that on the day previous Mrs. Weisskirch had been examined by Dr. Williams and her ailment diagnosed as cancer.

Previous to Mrs. Weisskirch's going to the Williams Sanatorium, she had received a letter and catalog from Dr. Williams in which she had been informed that small cancers could be cured in a few hours, and large cancers in from seven to nine days.

Mrs. Weisskirch is still receiving medical attention because of the unhealed condition of her body following the above removal of her right breast. She paid Dr. Williams a fee of $300.

The validity of the law was attacked during the trial and also the regularity of the appointments made by Governor Christianson to the Basic Science Board.

The Court overruled the defendant's objections, upholding the law and the appointments of the Board members, the Court's ruling being in direct opposition to the rulings made by the Court in Pope County in the case of State of Minnesota vs. Robert McGraw.

The case attracted quite a number of people and among those present were persons frequently seen at the State Capitol during the 1929 session of the Legislature.

On Monday, November 4, 1929, the Court imposed a fine of $250.

It was disclosed, during the trial, that the defendant was convicted on his plea of guilty in 1913 to practising medicine without a license and was fined $50; also that the defendant was convicted in 1928 on his plea of guilty to a violation of the Basic Science Law, at which time he was fined $100.

The investigation of the case was handled by Mr. Bris on behalf of the State Board of Medical Examiners. The trial and upholding of the Basic Science Law was handled by Mr. Skahen and Mr. Larson of the Hennepin County Attorney's office.

On November 22, 1929, a motion for a new trial was presented to Judge Baldwin in the above entitled matter. Following lengthy arguments and the furnishing of briefs on both sides to the Court, the motion was denied on December 3, 1929.

COMMUNICATION

To the Editor:

Dr. Lewis F. Smead, Chairman of our Board of Trustees, reports that a young man has been traveling throughout the country representing himself as "Lewis F. Smead, Jr., interne at Hopkins." This individual obtained sums of money from Dr. Smead's classmates in Duluth, Minnesota, and Helena, Montana.

Would it be possible for you to run a notice in the Journal of the Minnesota State Medical Association warning physicians to be on the look-out for this imposter? Dr. Smead has no son by the name of Lewis F., Jr. Any help you can give toward stopping this fraud would be appreciated by our Dr. Smead.

Very respectfully yours,

Wm. J. Burns,
Executive Secretary,
The Academy of Medicine,
Toledo, Ohio.

UNGUENTUM CARBONIS COMP. (HILF) NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that Unguentum Carbonis Comp. (Hilf) is marketed by the Hilf Products Co., Brooklyn, and that it is claimed to contain an alcoholic extract of crude coal tar, representing from 2 to 2.5 per cent of "its active constituents," menthol and thymol, each 2½ grains to the ounce; eucalyptol, 5 minims to the ounce; salicylic acid, 2 per cent; in a base consisting of kaolin and "boroglyceride" (equivalent to 10 per cent of boric acid). The Council declared Unguentum Carbonis Comp. (Hilf) unacceptable for New and Non-official Remedies because it is a needlessly complex and therefore unscientific mixture, which is marketed with unwarranted therapeutic claims and under a name which is insufficiently descriptive of its composition. (Jour. A. M. A., November 23, 1929, p. 1649.)

PRESIDENT'S LETTER

DURING the past several years the organization of the Minnesota State Association has progressed amazingly. The effect of this progress has been most noticeable in the field of political prestige, which has in turn excited the admiration of the societies of other states and that of the national association itself. This near spectacular advance has tended to obscure other evidences of constructive work. Therefore the attention of the profession should be drawn to other and no less important activities.

Today we hear much of the menace of state medicine, of the activities of lay bodies in the interest of both public and private health, of free clinics of various sorts, and we ponder upon what is happening and upon our own position in this confusing maze. We find ourselves wondering what the state society may be doing to interpret these many activities and to meet a situation tending possibly to engulf the profession within the meshes of socialism. What is upon us is just this: The public is alive to the importance of both preventive and curative medicine; through its lay organizations it is seeking to promote health and to combat sickness; in its zeal it is apt to work a grave injury to the medical profession, the instrument upon which it leans most heavily for the success of its efforts. We cannot turn this movement back, it is too tremendous, and we would not if we could. It is but a part of the onrush of our civilization.

Our duty is plain. It is to understand the nature and purpose of this movement; to lend wise counsel; to give coöperation in the promotion of that which is good; to exercise, through reason and persuasion, a restraining and guiding influence wherever it may be needed. The state society at this time is so organized as to give this matter proper attention. Through its committees now functioning a great deal is being done. These committees are well calculated to meet the issue wisely and scientifically. Most of our committees overlap in function in some degree and desirably so. Their memberships should interlock. They must function, not as independent bodies, but as a unit. The chairmen of these standing committees must meet, not once, but often. These committees serve as a means of contact between the medical profession and the various public health movements, both official and unofficial. They develop and execute methods of carrying health knowledge to the public and scientific extension service to the profession. Thus these committees promote and correlate our practical business and scientific interests.

Civilization and organization are interdependent. The former falls without the latter while the latter is selfish and oppressive without civilization. Every member of the medical profession in Minnesota should belong to the local, state and national organizations. The strong individualism of the phvsician has militated greatly to retard professional organization and progress. *But now the time has come when this individualism must be merged with the common interest if the profession is to escape subserviency.* Let all join in enthusiastic effort to fulfill our true function as physicians. We shall be worthy of the admiration of other professional bodies, of the respect and confidence of the people we serve and of our own esteem only as our organized strength and influence are used wisely and for the public good.

S. H. Boyer

President,
Minnesota State Medical Association.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of January will be as follows:

January 1—"Holiday"

January 8—"The Cause and Prevention of Bunions"

January 15—"Health and Safety"

January 22—"Our Present Knowledge of Infantile Paralysis"

January 29—"Preventable Blindness"

AMERICAN COLLEGE OF PHYSICIANS

The annual clinical session of the American College of Physicians will be held in Minneapolis Monday to Friday, February 10 to 14, 1930. Headquarters will be at the Auditorium.

Monday morning will be devoted to registration and each morning thereafter to clinics by visitors and local physicians at the various hospitals. Scientific sessions will occupy Monday and Tuesday evenings while a convocation and smoker is scheduled for Wednesday evening and a banquet for Thursday evening.

Members of the Minnesota State Medical Association are invited to attend the sessions.

Dr. S. Marx White is chairman of the local committee on arrangements. Special provision is being made for the entertainment of visiting ladies.

The morning clinics are not published in MINNESOTA MEDICINE but the following scientific program scheduled for the afternoons and evenings at the Auditorium gives a good idea of the type of program to be presented.

PROGRAM

MONDAY, FEBRUARY 10, 1930

OPENING SESSION, 2:30 O'CLOCK

1. Addresses of Welcome
   LOTUS DELTA COFFMAN, President of University
   ELIAS P. LYON, Dean of University of Minnesota Medical School.
   EDWARD L. TUOHY, Duluth, President of the Society of Internal Medicine
   S. H. BOYER, Duluth, President of the Minnesota State Medical Association.
   E. L. GARDNER, Minneapolis, President of the Hennepin County Medical Society
2. Reply to Addresses of Welcome
   JOHN H. MUSSER, JR., New Orleans, President of the American College of Physicians
3. Colloids in Medicine
   ROSS A. GORTNER, University of Minnesota
4. Cerebral Localization
   LEWIS J. POLLOCK, Chicago
5. The Psychological Panel in Diagnosis and Prognosis.
   WALTER FREEMAN, Washington, D. C.
6. Gastro-Intestinal Troubles that Now Go Undiagnosed
   WALTER C. ALVAREZ, Rochester, Minn.

EVENING SESSION, 8:00 O'CLOCK

1. Latent Hyperthyroidism Masked as Heart Disease
   SAMUEL A. LEVINE, Boston
2. Observations on the Etiology of Gall-Stones
   A. C. IVY, Chicago
3. The Significance of Atelectasis in Bronchopulmonary Conditions
   FREDERICK T. LORD, Boston.
4. Moving Pictures of the Results of Stramonium Treatment in Encephalitis
   FREDERICK EPPLEN, and (by invitation) A. L. JACOBSON, Seattle

TUESDAY, FEBRUARY 11, 1930

AFTERNOON, 2:00 O'CLOCK

VASCULAR DISEASE

1. The Effect of Generalized Arteriosclerosis upon the Heart and the Systemic Circulation
   GEORGE E. FAHR, Minneapolis
2. Some Newer Aspects in the Problem of Essential Hypertension
   NORMAN M. KEITH and JAMES W. KERNOHAN, Rochester, Minn.
3. The Retinal Vascular Changes in Hypertension
   HENRY P. WAGNER, Rochester, Minn.
4. Arteriosclerosis in Diabetes
   ELLIOTT P. JOSLIN, Boston
5. The Relations of Arterial Sclerosis and Renal Disease
   ALFRED STENGEL, Philadelphia
6. The Causes of Arterial Hypertension
   E. T. BELL, Minneapolis
7. The Management of Hypertension
   JAMES S. MCLESTER, Birmingham
8. The New Possibilities in Classification and Treatment of Anemia
   HILDING BERGLUND, Minneapolis
9. Cinematomicrographic Demonstration of Human Intestinal Protozoa. Pictures and Remarks on their Biology, Pathology and Treatment
   JOHN V. BARROW, Los Angeles

EVENING, 8:00 O'CLOCK

1. History of Syphilis
   JOSEPH L. MILLER, Chicago.
2. History of Certain Medical Instruments of Precision
   LOGAN GLENDENNING, St. Louis
3. Spontaneous Pneumothorax, Non-tuberculous
   F. J. HIRSCHBOECK, Duluth, Minn.

4. The Healing of Tuberculosis, Illustrated by Films and Slides
   FRANCIS M. POTTENGER, Monrovia, Calif.

WEDNESDAY, FEBRUARY 12, 1930

AFTERNOON, 2:00 O'CLOCK

1. Splenic Puncture as a Diagnostic Procedure in Infancy and Childhood
   JULIUS H. HESS, Chicago
2. I. Diagnostic and Physiologic Studies in Certain Forms of Scleroderma
   GEORGE E. BROWN and PAUL A. O'LEARY, Rochester, Minn.
   II. Surgical Indications and Operative Results in the Treatment of Vasospastic Types of Scleroderma with Sympathetic Ganglionectomy.
   A. W. ADSON, Rochester, Minn.
3. Sympathectomy in Polyarthritis
   LEONARD G. ROWNTREE, Rochester, Minn.
4. The Relation of Experimental Rheumatoid Inflammation to Allergy
   BENJAMIN J. CLAWSON, Minneapolis
5. In Defense of the Stethoscope
   JAMES B. HERRICK, Chicago
6. Rectal Temperature Curves; Normal and Abnormal
   WILLIAM B. BREED, Boston
7. The Limitations of Heliotherapy in Pulmonary Tuberculosis
   BERNARD L. WYATT, Tucson
8. Résumé of Our Present Attitude Regarding Iodine in the Treatment of Toxic Goiter
   JAMES H. MEANS, Boston
9. Unusual Addison's Syndromes
   A. B. BROWER, Dayton, Ohio
10. A New Method for the Treatment of Pellagra
    CLYDE BROOKS, University, Alabama
11. Multiple Polyposis of the Colon
    J. A. BARGEN, Rochester, Minn.

EVENING, 8:00 O'CLOCK

CONVOCATION OF THE COLLEGE

The General Profession is cordially invited. No special admission tickets are required.

1. Convocation Ceremony
2. President's Address
   JOHN H. MUSSER, JR., New Orleans

The Smoker will follow the Convocation exercises, after a brief intermission. An attractive program has been arranged.

THURSDAY, FEBRUARY 13, 1930

AFTERNOON, 2:00 O'CLOCK

1. Symposium on the Biology of Cancer
   The Etiology and Biology of Cancer
   LEO LOEB, St. Louis
   The Nature of Heredity in Animals
   H. GIDEON WELLS, Chicago
   Heredity of Cancer in Man
   ALDRED SCOTT WARTHIN, Ann Arbor
   The Principles of Radiation Treatment
   FRANCIS CARTER WOOD, New York
2. Undulant Fever in California
   J. EDWARD HARBINSON, Woodland, Calif.
3. Undulant Fever: A Clinicopathological Study
   WALTER M. SIMPSON, Dayton, Ohio
4. Curing the Ulcer Patient
   SEALE HARRIS, Birmingham

The General Business Meeting of The College will be held at 4:00 o'clock in the Auditorium. All Masters and Fellows should attend.

EVENING, 7:00 O'CLOCK

The Curtis Hotel

THE ANNUAL BANQUET OF THE COLLEGE

A Dance will follow the Banquet.

FRIDAY, FEBRUARY 14, 1930

AFTERNOON, 2:00 O'CLOCK

1. Some Observations of Functional Diseases of the Alimentary Tract
   WILLIAM GERRY MORGAN, Washington, D. C.
2. Remarks on Chronic Infections
   ALLEN K. KRAUSE, Tucson
3. Symposium on the Rôle of Surgery in Pulmonary Tuberculosis
   Pneumothorax
   JAMES BURNS AMBERSON, Loomis, N. Y.
   Pneumolysis
   RALPH C. MATSON, Portland, Ore.
   Multiple Intercostal Neurectomy and Phrenicectomy
   JOHN ALEXANDER, Ann Arbor
   Thoracoplasty
   PHILIP KING BROWN, San Francisco
   General Considerations of the Rôle of Surgery in Tuberculosis
   GERALD WEBB, Colorado Springs
4. The Diagnosis of Pre-Clinical or Latent Tubercle by Caulfield's Inhibitive and the T. C. F. (with Lantern Slides of Chests and Graphs)
   W. E. OGDEN, Toronto
5. A Diagnostic Triad in Syphilitic Aortitis
   C. SAUL DANZER, Brooklyn

HOUSTON-FILLMORE MEDICAL SOCIETY

The annual business meeting of the Houston-Fillmore Medical Society was held at Rushford, Minnesota, Oct. 24, 1929. A dinner was served at the home of Dr. R. V. Williams, after which an interesting talk was given by Dr. J. M. Hayes of Minneapolis. At the business meeting the following officers were re-elected: Dr. R. V. Williams, president; Dr. G. B. Belote, vice president; Dr. J. W. Helland, secretary; Dr. J. C. Lannin, treasurer; Dr. R. V. Williams, delegate.

The Women's Auxiliary held their annual meeting at the same time.

A vote of thanks was given Dr. Hayes for his talk and to Dr. and Mrs. Williams for the dinner.

J. W. HELLAND, M.D.,
Secretary.

SECRETARIES' CONFERENCE

The Secretaries' Conference will be held at the St. Paul Hotel, St. Paul, Minnesota, on January 11, 1930, beginning at 9:30 a. m. The conference this year promises to be one of unusual interest and it is important that all secretaries be present. The Lay Health Program of the St. Louis County Medical Society, The Community Hospital and its Original Staff, Malpractice Insurance and its Relations to the Hospital and its Personnel, Storage of *X*-ray Films, Public Health Nursing Standards and the Heart Disease Campaign are some of the subjects to be discussed.

MOWER COUNTY MEDICAL SOCIETY

At the annual meeting of the Mower County Medical Society held December 5 the following officers were elected:

President	Dr. J. G. W. Havens, Austin
Vice President	Dr. P. A. Lommen, Austin
Secretary	Dr. C. L. Sheedy, Austin
Treasurer	Dr. A. E. Henslin, LeRoy
Delegate	Dr. J. G. W. Havens, Austin

RAMSEY COUNTY MEDICAL SOCIETY

At the annual meeting of the Ramsey County Medical Society held November 25, 1929, the following officers were elected:

Dr. Fred Schuldt—President
Dr. Charles Freeman—Vice President
Dr. Albert Schulze—Secretary-Treasurer
Dr. Frank E. Burch—Member Boeckmann Library Building Fund

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The Southwestern Minnesota Medical Society met at Slayton, Minn., Nov. 5, 1929, for their annual meeting. Dr. W. E. Patterson, Westbrook, Minn., was elected president; Dr. E. W. Arnold, Adrian, Minn., vice president; Dr. E. G. McKeown, Pipestone, Minn., Secretary-Treasurer. Mr. F. M. Brist, Saint Paul, was the speaker for the evening.

STEELE COUNTY MEDICAL SOCIETY

The annual meeting of the Steele County Society was held at Owatonna, November 19, Dr. E. J. Nelson, vice president, presiding.

Officers elected for the coming year were:

President	Dr. E. J. Nelson
Vice president	Dr. J. A. McIntyre
Secretary	Dr. A. B. Hart
Treasurer	Dr. J. F. Smersh
Censors	Dr. E. W. Senn, 1 year
	Dr. T. C. Quigley, 2 years
	Dr. B. Melby, 3 years

Delegate to the State Medical Association, Dr. A. B. Stewart; alternate, Dr. J. A. McIntyre.

Dr. J. T. Christison, president of the State Association, addressed the Society following the business meeting.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry.

CURDOLAC FOOD CO.
- Curdolac Soya Flour
- Curdolac Casein-Bran Improved Flour
- Curdolac Soya-Bran Flour
- Curdolac Breakfast Cereal
- Curdolac Casein Compound
- Curdolac Wheat-Soya Flour
- Curdolac Soya-Cereal Johnny Cake Flour
- Curdolac Soya-Bran Breakfast Food

CUTTER LABORATORY
- Ampoule Solution Silver Nitrate, 1 per cent
- Typhoid Paratyphoid Prophylactic hospital size package
- Polyanaërobic Antitoxin

DE PREE CHEMICAL CO.
- Sulpharsphenamine-De Pree, 0.5 Gm. Ampules
- Sulpharsphenamine-De Pree, 0.9 Gm. Ampules

H. K. MULFORD CO.
- Gelatin Compound Phenolized-Mulford
- Diphtheria Toxoid-Mulford, 30 c.c. vial
- Erysipelas Streptococcus Antitoxin, Concentrated, 10 c.c. syringe
- Typho-Bacterin Mixed (Triple Vaccine TAB), thirty 1 c.c. vial package
- Typho-Serobacterin-Mulford (Sensitized Typhoid Vaccine), 3 syringe package
- Normal Horse Serum without Preservative

NATIONAL DRUG CO.
- Diphtheria Toxoid

THOMPSON'S MALTED MILK CO., INC.
- Thompson's Maltose and Dextrin

TRUTH ABOUT MEDICINES

Digitos Ampules, 5 c.c.—Each ampule contains digitos (New and Non-official Remedies, 1929, p. 138), 5 c.c. H. K. Mulford Co., Philadelphia.

Luminal Capsules, 1 1/2 grains.—Each capsule contains luminal (New and Non-official Remedies, 1929, p. 81), 1½ grains. Winthrop Chemical Co., Inc., New York.

Metaphen 2,500.—It contains 1 part metaphen (New and Non-official Remedies, 1929, p. 272) dissolved in 2,500 parts of water containing 0.33 per cent each of sodium bicarbonate and sodium carbonate. Abbott Laboratories, North Chicago.

Diphtheria Toxoid-Squibb.—This diphtheria toxoid (New and Non-official Remedies, 1929, p. 368) prepared from diphtheria toxin whose L+ dose is 0.2 c.c. or less by treatment with 0.3 to 0.4 per cent formaldehyde. It is tested for antigenic potency by injection into guinea pigs. It is marketed in packages of one immunization treatment of three 1 c.c. vials; in packages of ten immunization treatments of thirty 1 c.c. vials; also in packages of one 30 c.c. ampule. Cutter Laboratory, Berkeley, Calif. (Jour. A. M. A., November 16, 1929, p. 1559.)

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Report of the Public Relations Committee of the St. Louis County Medical Society

The Public Relations Committee is completing its second year. During this short period it has developed into a committee with more demands on it for service than any other in the society. This has been brought about in spite of the fact that no aggressive attitude has been taken, but rather the committee has stood ready to render service whenever called upon. This proves conclusively that up to two years ago we were passing a golden opportunity to sell a modern scientific medium to the public. No one will argue the fact that information given to the public, through talks and other methods, promotes better health and more happiness. With less preventable diseases, there will be more efficiency and greater production with the general benefit to the whole community. Looking at it from a selfish point of view, it gives us an opportunity to create a greater demand for medical services. Scientific Medicine has much to offer and nothing to hide. Having goods of merit, the better the public is acquainted with, the greater will be the demand for them. We have so many lines that have hardly been touched. The foremost, perhaps, being periodical health examinations.

About one hundred talks have been given to groups and organizations during the past year. Nearly sixty were given during health week last winter. Material was furnished for the "Annual Baby Section" of one of our daily papers, which provoked a very complimentary editorial for us. Speakers have been provided for the "Sixth Industrial Safety School" which was conducted by the Chamber of Commerce last month. The audience consisted of seven to eight hundred foremen and superintendents from Duluth and surrounding towns, who in turn take the message home to the men working under them, so, ultimately, we will reach many thousands.

Work with the newspapers has been rather discouraging. Material presented to them is so badly revamped, it is almost impossible to recognize it in print. Their attitude is changing and they are now calling for material more often, so it is hoped that before long they will be less suspicious that we are looking for free advertising and will be more willing to coöperate.

F. H. MAGNEY, M.D., *Chairman.*

WHAT YOUR STATE MEDICAL ASSOCIATION DOES FOR YOU

1. Publishes the scientific journal, MINNESOTA MEDICINE.
2. Creates a Fraternal feeling among physicians and enables them to coöperate with each other in local and state matters.
3. Studies constantly the many changes that are taking place in scientific and economic medicine through the many activities of the committees.
4. Notifies members of current events that affect the profession through MINNESOTA MEDICINE, and also sends special communications of unusual, legal, and legislative occurrences.
5. Conducts graduate courses covering the newer aspects of medical practice.
6. Proposes state legislation in the interests of scientific medicine and the public health. It has also been instrumental in defeating many measures which have been proposed to the detriment of scientific medicine and public health.
7. Assists local societies in presenting programs of interest and in securing speakers.
8. Enables its members to secure malpractice insurance at a reduced rate.
9. Conducts an Annual Meeting to which the best medical men in the state and county bring the results of their latest experience and research.
10. Furnishes the members prompt and confidential information on any subject relating to the practice of medicine through the Consultation Bureau.
11. Sends our Legislators *Hygeia* and *Everybody's Health* in order that they may be properly informed on matters of health.
12. Maintains a Speakers Lay Library containing material on subjects suitable to laymen and loans the material to the doctors upon request.
13. Sends weekly health stories to two hundred and sixty rural newspapers.

The welfare of the profession depends upon the support you give it. A well organized profession means greater respect and better compensation.

OF GENERAL INTEREST

Dr. Tom A. Williams, late of Washington, D. C., has returned to Florida from a year in Europe and is now located at the Monterey Apartments, 1611 Michigan Avenue, Miami, Florida.

Leland A. Watson, son of Dr. and Mrs. J. A. Watson of Minneapolis, has been selected as one of thirty-two students in the country to receive the Rhodes scholarship this year. The men elected will take up their studies in Oxford, England, in October, 1930.

Dr. Charles Bolsta of Ortonville, Minnesota, was appointed in December by Governor Christianson to succeed Dr. S. H. Boyer of Duluth as a member of the state board of examiners in the basic sciences. Dr. Bolsta's term of office is for six years, ending April 1, 1935.

The new Community hospital at Detroit Lakes, Minnesota, was opened in December. The new building is a two story structure with full basement and is equipped with 21 beds, placed in 17 rooms. The nurses' quarters are in the basement and consist of a suite of three rooms.

The marriage of Miss Margaret Ritchie of Little Falls and Dr. Asher Abbott White, son of Dr. and Mrs. S. Marx White, of Minneapolis, was solemnized at the First Congregational church in Little Falls, Saturday, December 14. They will make their home in New York, where Dr. White is completing his internship.

The following five University of Minnesota students have been recommended to the medical offices of the United States Army in Washington for internships of one year beginning in July at one of the five Federal Army hospitals in the United States: Norman Anderson, Frank Bacon and Verne Carlson, Minneapolis; Kenneth Ernst, St. Cloud; Theodore Fritsche, New Ulm. Carl Horn of Minneapolis and Robert Hargreaves of Saint Paul were named alternates.

Dr. W. A. Jones announces the termination of his association with Doctor Kittelson. Beginning January 1, 1930, Dr. N. J. Berkwitz will be associated with Doctor Jones. Doctor Berkwitz has been in the department of nervous and mental diseases since 1925 as a teaching fellow and as an assistant and he also was a resident physician at the Boston Psychopathic Hospital for six months. He has recently received a Doctor of Philosophy degree in Nervous and Mental Diseases.

The Eustis Addition to the University Hospital is now open and beds are available for the care of crippled and deformed children who are under 15 years of age. Cases over this age and adults can be taken care of in the General Hospital, where the Orthopedic Division is also functioning. Application for admission to the Orthopedic beds must be made in the same way as for admission to the other services and blanks can be obtained upon request from the hospital.

The Eustis fund provides for not more than 20 free beds, and doctors interested in these should correspond directly with the Superintendent of the hospital. Children who are mentally below the average will not be admitted.

SHORT COURSES IN TUBERCULOSIS SUCCESSFUL

With approximately 140 physicians in attendance and many other applications not accepted because of limitation in size of the classes, the seven short courses in tuberculosis held in Minnesota this fall under the auspices of the Minnesota State Medical Society, the Minnesota Public Health Association, and the various sanatoria were a success, according to the authorities of the various coöperatng organizations.

In addition to lectures by various authorities on tuberculosis, practical demonstrations of tuberculin testing were given. Sanatorium children were given the test previous to the day of the meeting, and examined by the visiting physician for their reactions. *X*-ray pictures were also studied. Medical examinations of patients were made by the enrolled physicians and were checked with the *x*-ray pictures.

Subjects which were discussed included Surgical Complications, Collapse Therapy, Tuberculosis in Children, *X*-ray, Sanatorium Management, History, Gastro-Intestinal Tuberculosis, Sanatorium Care of Tuberculosis in the State, Diagnosis, and Sanatorium Cases.

Among the physicians of the state who spoke at the various short course sessions were Dr. H. L. Taylor, Dr. F. F. Callahan, Dr. E. K. Geer, all of Pokegama Sanatorium; Dr. W. S. Broker, Ottertail County Sanatorium; Dr. Fred Kumm, Fair Oaks Lodge Sanatorium; Dr. L. H. Flancher, Sand Beach Sanatorium; Dr. W. G. Paradis, Sunnyrest Sanatorium; Dr. L. S. Jordan, Riverside Sanatorium; Dr. S. A. Slater, Southwestern Sanatorium; Dr. E. S. Mariette, Dr. F. L. Jennings, and others from Glen Lake Sanatorium; Dr. J. A. Myers, Dr. W. A. O'Brien, Dr. L. G. Rigler, Dr. W. H. Ude, and Dr. C. B. Wright, all of the teaching staff of the University of Minnesota; Dr. Arnold S. Anderson, executive secretary, State Board of Control, Tuberculosis Division; and Dr. George Earl, Chairman, Public Health Education Committee, State Medical Association.

In connection with the majority of the short courses, public meetings were held in the evening and were well attended. A number of the short course staff gave popular health talks at these meetings and also spoke at high school and college assemblies in the towns visited.

Christmas Seal Funds helped finance these courses.

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—I have a young man, seventeen years old, who had a Wassermann test made a year ago. He received two injections of neosalvarsan at that time. He did not have any other treatment and gradually grew worse. His mind is now affected; he is not able to walk; he is in bed most of the time.
I am giving him neosalvarsan every five to six days. Will you kindly advise me as soon as possible what the latest treatment for syphilis is? Is there any other drug being used besides salvarsan?

   Answer.—I assume from your letter that the original Wassermann test and treatment was done elsewhere. I would advise you to repeat the blood Wassermann and to do a spinal fluid examination. It would also be a good idea to check your neurological findings again. If you are satisfied that he has syphilis with involvement of the central nervous system, the following treatment is suggested:
   (1) Tryparsamid once a week for twelve weeks. This is given like neosalvarsan. Start with the one gram dose and increase to three grams.
   (2) Follow with six to eight treatments of .6 neosalvarsan every five days.
   (3) Then follow with bismuth salicylate in oil every four days or twice a week for twelve weeks. Give one to two c.c. in the hip.
   After doing this, we would be very glad to hear from you again and advise you as to the best type of treatment to follow.

2. *Question.*—I would like to find out about the use of typhoid vaccine intravenously in the treatment of arthritis:
   (1) What dose should be used?
   (2) How many times should this dose be repeated?
   (3) For what types of arthritis is this treatment best used?
   (4) What advantage has this over the intramuscular injection of boiled milk or other proteins?
   (5) What is the theory of its mode of action?
   I have a patient, age 29, male, who, I think, would be benefited by this treatment. He has had pain in the left hip, radiating down the leg into the calf of the leg, and sometimes into the instep, since January of this year. It was quite severe until the warm summer months, when, he states, "He could just notice it." This fall, beginning with the cold, the pain has recurred, at times causing loss of sleep and compelling him to do very little, if any, work. He does not have a fever, has not had any redness or swelling of his joints, and the pain is limited to left hip and leg. An *x*-ray of the pelvis was negative. Two suspicious teeth were extracted, and his tonsils were removed with very little, if any, improvement. Please advise me as to the possibility of benefit in this case from the use of typhoid vaccine. This patient has not been benefited by use of salicylates by mouth or intravenously.

   Answer.—Before any further treatment is given, it is best to consider the diagnostic possibilities, and sciatic neuritis should be given consideration. The history of your patient suggests that the nerve may be involved. Is the pain worse on stretching the leg? Is there any atrophy of the calf muscles? Is the Achilles' jerk absent on the affected side? I note that you have had *x*-rays of the pelvis. In a young man with persistent pain such as you have described, osteogenic sarcoma should be considered. We have seen several examples of a long history of pain before the appearance of bone or *x*-ray findings. If you can rule out tumor, and are sure that the joints are not involved, we would suggest using injections of salt solution in the nerve with absolute bed rest and applications of heat before trying protein therapy.

3. *Question.*—There are many lamps on the market at the present time, which are supposed to deliver ultraviolet radiation. How does one gauge the effectiveness of the various types offered to the public?

   Answer.—The best way to compare the various types of lamps is to find out the number of minutes necessary to secure an erythema dose. There is a lamp on the market at the present time, which gives a slight erythema in 45 minutes. This would place it in the harmless class and would be suitable for use in a children's playroom. There is another lamp sold for home use from which an erythema dose can be obtained in 10 to 12 minutes. There is still another in which the erythema dose can be secured in practically the same time as in a physician's office. Before purchasing a lamp it would be best to ascertain the effectiveness of the same by measuring it in the foregoing terms.

4. *Question.*—Would you please send me the treatment for epidemic encephalitis, which is considered the best. If it is the use of neutral acriflavine, please give me the name of the company from which we can get it in the form of ampoules.

   Answer.—We assume that you refer to the chronic stage of epidemic encephalitis. The treatment of the acute stage is the same as the treatment of any other acute disease. We have found that hyoscine hydrobromide in grains 1/100 doses two or three times daily for an adult of 150 pounds gives the best relief of the symptoms of rigidity and tremor. It is true that this is not uniformly successful, but it seems to offer us the best therapy that we have. Neutral acriflavine, in our experience, has not been so successful. We have tried it, however, and intravenous injections can be made. Ampoules of neutral acriflavine may be obtained from any supply house. In any event, it is very difficult to separate the psychic response from real therapeutic result.

OBITUARY

Charles L. Carman

1859-1929

Dr. C. L. Carman, for thirty years a practising physician of Saint Paul, died on the evening of December 13, 1929, at Saint Luke's Hospital, Saint Paul.

Born February 19, 1859, in Kingston, Ontario, Dr. Carman left his home as a young man to study music in New York. When he first came to Saint Paul he taught voice and was very active in musical circles.

A short time after coming to Saint Paul Dr. Carman decided to study medicine and graduated at the University Medical School in 1897. He has practised medicine in Saint Paul ever since, in recent years having specialized in nose and throat diseases.

Dr. Carman joined the Ramsey County Medical Society March 1, 1909, and has been an emeritus member in recent years.

Dr. Carman is survived by one son, Dr. Paul Carman of Saint Paul, and four sisters, Ella and Blanche Carman of Buffalo, New York, Mrs. George Agnew of Mission, Texas, and Mrs. Marcus Simpson, South Glastonbury, Connecticut.

Floyd E. Best

1887-1929

Dr. Floyd E. Best died at his home at Wells, Minnesota, Nov. 9, 1929.

Dr. Best was born Dec. 13, 1887, at Freeport, Ill. He graduated from the Freeport High School in 1906, taking his B.A. degree from the University of Illinois and his M.D. from Northwestern University in 1911. He received his Minnesota license in 1913. His internship of 18 months at St. Joseph's Hospital, Chicago. He also served in hospitals at Los Angeles, Calif., and the Catalina Islands before starting his practice at Wells, Minnesota. During the world war Dr. Best was a first lieutenant in the medical corps, being stationed at Washington, D.C., and later at Humphrey, Va., during the "flu" epidemic. He was graduated from the Army Medical School at Washington, Oct. 25, 1918. Following the war he resumed his practice at Wells, in partnership with Dr. P. F. Holm.

Dr. Best was a member of the Southern Minnesota Medical Association, the Blue Earth Valley, Minnesota State and American Medical Associations.

RESOLUTION OF CONDOLENCE

by the Physicians of the Blue Earth Valley Medical Society.

WHEREAS, the Supreme Ruler of the Universe in His Infinite Wisdom has seen fit to remove from our midst Dr. Floyd E. Best of Wells, Minnesota, an esteemed member of the Blue Earth Valley Medical Society,

THEREFORE BE IT RESOLVED, by the Physicians of this Society,

THAT we deeply regret the passing of a beloved fellow practitioner, because of the unselfish service rendered to his brother physicians and to his patients,

BE IT ALSO RESOLVED, That we offer to his family, their friends and the people of the vicinity of Wells, our most profound and heartfelt sympathy, and that copies of this resolution be sent to the family of the deceased member and to the Wells *Mirror*, and to MINNESOTA MEDICINE, Journal of the Minnesota State Medical Association, and be spread upon the minutes of the Blue Earth Valley Medical Society.

(Signed)
WM. H. BARR, M.D.
P. F. HOLM, M.D.
A. J. HENDERSON, M.D.
Committee.

Olaf Thorstein Sherping

1864-1929

Dr. Olaf Thorstein Sherping died suddenly at 4:15 a. m., December 7, at his home in Fergus Falls. The cause of death was angina pectoris.

Dr. Sherping was born Aug. 6, 1864, in Hallingdal, Norway. He was educated in the high school at Ness, and the University of Christiania. In 1884 he migrated to this country. Here he first worked on a farm, then studied medicine in a physician's office in Wisconsin, and later attended Valparaiso University, where he received the degree of Bachelor of Science. In 1893 he graduated from the Keokuk Medical College. Later he did post-graduate work in surgery in Chicago, New York, London and Vienna.

Dr. Sherping engaged in practice in Enderlin, N. D., from 1893 to 1902. He then moved to Fergus Falls, where he practised continuously until his death.

Dr. Sherping was the founder of St. Luke's Hospital of Fergus Falls, and served as Chief of Staff until 1928. He was a member of the American College of Surgeons, and a former member of the Minnesota State Board of Health.

In 1895 he married Miss May Sollin of Valley City, N. D., who, with his son Ralph, survives him.

His chief interest was in the field of surgery, and from the time when he first performed operations in the sod huts of Dakota until his death, he held a position of notable distinction in his profession.

UNDULANT FEVER

A specific treatment of undulant fever is not yet available. The use of serums has proved disappointing. Vaccines have given more encouraging results according to recent reports from the continent. In particular, an antigen prepared from dried *Brucella abortus* has seemed efficacious in a small number of cases. In this country the use of acriflavine hydrochloride has been suggested to shorten the duration of the disease. (Jour. A. M. A., November 9, 1929, p. 1475.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of November 13, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 13, 1929. Dinner was served at 7 p. m., and the meeting was called to order at 8 p. m. by the President, Dr. C. N. McCloud.

There were 35 members and 1 visitor present.

Minutes of the October meeting were read and approved.

A committee consisting of Drs. J. W. Bell, Geo. D. Head, and S. Marx White was appointed to draw up resolutions on the death of Dr. Louis A. Nippert.

The scientific meeting consisted of the following:

DR. H. A. H. BOUMAN (Minneapolis) read an historical study of "The Goiter Problem and Theodor Kocher."

DISCUSSION

DR. GUSTAV SCHWYZER (Minneapolis): We have listened to night to an essay which is the result of an extensive historical study concerning goiter surgery and its founder, Theodor Kocher. Nowadays when thyroid surgery is being done all over the world, it may be timely to bring out the life of the man who did most of the pioneer work in this line.

Dr. Bouman's paper is indeed laudable and commendable. He refers to many of the circumstances of historic interest that surrounded the men who began goiter surgery, and mentions the obstacles these pioneers had to overcome. He calls to our attention Billroth, who was Professor of Surgery in Zurich about 1860-67. I well remember one of his papers on goiter surgery that I read years ago. He reported a small number of goiter cases and of these most of them died from tetany. This mortality rate exceeded Kocher's. The latters success might have been due to his careful way, his method in handling the recurrent nerve and leaving what we call today the safety zone—all such procedures at a time when parathyroids were unknown.

Dr. Bouman's essay does not, in my estimation, call for discussion; however, if you will allow me I will add a few words about Theodor Kocher, with whom I was intimately connected in the nineties. He was a brilliant teacher. His clinics were world-famous. Any one who ever had the privilege of attending one of his clinics could not help being impressed by the magnitude of his knowledge and the accuracy of his diagnosis.

Kocher was not only a brilliant teacher, he was also a great leader as surgeon and writer. Over 200 papers were published in different journals during his activity. He collected the important facts from his material and compiled them into book form for permanent reference. His book on fractures is even today a very commendable work. Another book, which has never been translated into English, on lesions of the spine due to injury or fracture was not only of great surgical interest but an addition to physiology of the spine as well. His work on staphylomycosis and streptomycosis is unique. His book on operative surgery truly expresses the vast wisdom he amassed in his lifetime. There is no phase of surgery wherein Kocher did not do original work.

Always trying to get nearer and nearer the truth, he never missed an opportunity to attend a postmortem examination during his forty-five years of activity at his clinic in Berne.

His endurance for work was simply marvelous, and remained so until his last days. Just two days before he died, in his 74th year, he successfully performed an extensive abdominal operation.

I think we all feel grateful to Dr. Bouman for his interesting review on goiter surgery that he has given us tonight.

DR. J. T. CHRISTISON (St. Paul) reported a case of subacute aleukemic lymphatic leukemia in a young boy, and showed lantern slides.

The patient, a small Canadian boy of 6 years, was admitted to the Charles T. Miller Hospital on September 8, 1929, complaining of a fluctuating temperature, anemia and listlessness.

The child was perfectly well until March, 1928, when he suddenly became ill with a sore throat and high fever. He was confined to his bed for about 5 weeks. His temperature became normal after three weeks' time, when desquamation of the hands and feet was noticed. He had no urinary symptoms, and the father does not recall the child having a cough, nor did he notice a rash. Following this illness the child was pale and listless, but the father was not aware of any elevation of temperature.

Some time early in August, 1929, the mother noticed a marked change in the child. On awakening in the morning he would complain of being very tired and preferred to remain in bed. There was a slight elevation of the temperature at this time and there were noticed black and blue spots over the body, varying in size up to that of a silver half dollar, and apparently spontaneous.

The patient was not a bleeder, although he had had one nosebleed in the latter part of August, which was very mild and lasted only a few minutes.

At the onset of this illness in August the child complained of his legs hurting and seemed to have a painful right knee, at times walking a little stiff.

On September 6, 1929, the child was taken to a hospital in Canada, where the father was told that the child had a very bad heart. He was kept in the hospital one day, receiving no treatment nor medication except aspirin (5 grains every hour for 12 hours). While there his temperature varied from 101.4 to 106 degrees and his pulse from 130 to 148.

The child was then brought to St. Paul and admitted to the Miller Hospital.

Investigation brought out the fact that the child had had no other illnesses except those already mentioned.

He had a tonsillectomy about five years ago, was a breast-fed baby, having been delivered normally.

The child's father and mother, 38 and 36 years of age, respectively, are apparently well, although it was learned that the mother gets very pale at times and has dyspnea on exertion. The father, at the time this history was taken, also looked very pale. One sister, ten years, and one brother, four months, are well, although there is a history of eczema and asthma in these two children. One brother died at thirteen months, of influenza. There is no history of eczema or asthma in the parents or grandparents; nor is there a history of tuberculosis, and it is not known that there were any bleeders in the family.

The father stated that the child passed very large amounts of urine rather reluctantly, complaining of pain. Previous to hospital entry no blood had been noted in the urine.

The child had not been constipated nor had he had diarrhea, and no blood had been noted in the stools.

There had been no swelling of the hands or feet.

A blood transfusion was done on the day after admission to the hospital (Sept. 9) and 500 c.c. of blood given. The patient was classed in Group IV, as was his donor, and the two bloods matched without agglutination. Before the transfusion his blood was: Hb. 23%; red cells 1,550,000; leukocytes 5,350; granulocytes 3%; lymphocytes 97%; and platelets 52,500. After the transfusion his blood was: Hb. 48%; red cells 3,340,000; leukocytes 4,300; granulocytes 4%; lymphocytes 91%.

On September 18 a blood pressure cuff was applied to the left arm and the mercury kept between 95 and 102 mm. The forearm was covered with a light cradle and in six minutes the arm suddenly became covered with small petechial hemorrhages.

On this date he was again transfused, receiving 500 c.c. of blood, the donor this time also being in Group IV and the two bloods matching without agglutination. Before transfusion his blood was: Hb. 48%, red cells 3,340,000; leukocytes 7,750; granulocytes 4%; lymphocytes 93%; and platelets 32,500. After transfusion it was: Hb. 60%; red cells 3,800,000; leukocytes 4,350; granulocytes 4%; lymphocytes 92%; and platelets 97,500.

A consultation by Dr. Connor, of the Nose and Throat Department, disclosed an existing condition of herpes labialis and pale mucous membranes; also a suggestion of thickening of the buccal surface of the gingiva and buccal pads, a scar of a healed ulcer between the upper right first and second bicuspids, and although the tonsils were out there was one small follicle at the base of each fossa. The nose was negative except for pallor and slight septal erosion on each side. There was no sinus infection.

Two weeks later the findings were the same except for the presence of enlarged hemorrhagic follicles in the pharyngeal wall.

On October 4, three teeth were extracted under nitrous oxid anesthesia.

On October 10 the patient was again transfused. He received another 500 c.c. of blood, his donor being classed in Group IV and the two bloods matching without agglutination. This time his blood before transfusion was: Hb. 50%; red cells 2,810,000; leukocytes 6,350; granulocytes 4%; lymphocytes 96%; and platelets 28,000. After the transfusion it was: Hb. 68%; red cells 3,750,000; leukocytes 8,050; granulocytes 5%; lymphocytes 95%; platelets 24,000.

Examination on October 22 showed a petechial rash over the lower extremities and mucous membrane of the mouth. A general reticulo-endothelial proliferation was seen. All glands were moderately enlarged and somewhat hard. At the costal margin the spleen was felt to be somewhat enlarged, though not of lymphatic leukemic type. The liver was also felt at the costal margin.

On October 24, under nitrous oxid anesthesia, several small lymph nodes were removed from the right axillary region. The largest of these was about 5 millimeters in diameter. Microscopic examination showed the prominent feature of the sections to be the diffuse infiltration of large lymphoid cells throughout the nodes, which obliterated the sinuses. The capillary endothelial cells were swollen and prominent everywhere. Diffuse hemorrhage was noted in some areas. The reticulum fibers and reticulum cells were prominent in some parts. The capsules were apparently unbroken. One showed a thickening, edema and hemorrhage and invasion of lymphoid cells into it. A diagnosis of leukemic infiltration of the lymph nodes was made.

At this time the child complained of slight pain in his right knee, especially when the leg was fully extended. There was no apparent swelling, redness or papable tenderness, and measurements of the knees were found to be exact.

Subsequent examination at this time showed the lower edge of the spleen palpable at the left lower costal margin although abdominal distension was so marked as to make palpation unsatisfactory.

During the patient's hospitalization his temperature varied from 98 to 105.4 degrees, and his pulse from 80 to 160.

All urine examinations were negative.

On September 13 his bleeding time was 3 minutes and 20 seconds, and his clotting time 5 minutes and 25 seconds. On October 23 his bleeding time was 5 minutes, and his clotting time 6 minutes and 10 seconds.

Hemoglobin ranged from less than 20% to 70%.

Leukocytes ranged from 1,200 to 12,800.

Red blood cells ranged from 890,000 to 3,990,000.

Reticulocytes from .04% to .3%.

In Schilling Differentials, granulocytes varied from 0 to 6% and the lymphocytes from 90% to 100%.

Platelets varied from 97,500 to 10,000.

Widal was negative.

Blood culture was negative after four, seven, ten, twenty-one and thirty days' incubation.

Blood smear showed 97% lymphocytes. Lymphocytes were of usual mature types with normal variations in size. One per cent were immature or lymphoblast type, a common finding in cases with a marked lymphocytosis. The changes in the red cells are slight for the

grade of anemia. Slight anisocytosis and slight poikilocytosis was present.

Blood smear was submitted to Dr. Downey of the University of Minnesota for his opinion. He agreed with the hospital pathologist in a probable diagnosis of leukemia, subacute stage.

Morphological study (9/30) strongly suggested subacute aleukemic lymphatic leukemia. The pathologist advised consideration of prolonged chronic infection, also.

Morphological study of smears (10/3) showed appearance of the lymphocytes to indicate many of them were pathologic. Nuclei showed a fine, delicate, more or less homogeneous chromatin network and little condensation. In a few, one or more nucleoli were noted and occasionally they were lobulated (questionable Reider type). A narrow zone of dark dirty blue cytoplasm was noted. Apparent absence of cytoplasm in some was not due to staining reaction. A few more mature large lymphocytes showed a wide zone of bluish hyaline cytoplasm in which a few azure granules were seen. Gumprechet shadows were not seen. The red cells showed little polychromasia, if any, and no basophilic granular degeneration. Platelets were very scanty. Granulocytes were less than 10 per cent of cells. Myelocytes, metamyelocytes and older metamyelocytes (band form) were recognized as much as the fully mature neutrophiles, but they were very scarce. Basket cells were seen occasionally. Of course there were many fully mature lymphocytes and occasional plasma cells.

Microscopic examination of the feces showed no red blood cells, leukocytes, parasites or ova. All the usual qualitative tests for urobilin were positive.

Culture of the teeth showed a predominating growth of nonhemolytic streptococci and of staphylococci.

The patient failed rapidly the last week of his life and on the morning of October 29 he had two convulsions, and died of general exhaustion.

DISCUSSION

DR. CHRISTISON: We had an opportunity to observe this entire family. The mother was pale and decidedly anemic in appearance. She was advised to stop nursing the baby. We had blood counts made on the baby, who was left in the hospital for some time, and also on the daughter. I asked Dr. Richards to investigate the mother's condition and he will tell you something about that.

The whole picture from the beginning to end was a hopeless one, as most of these cases of leukemia usually are. An autopsy was done on this boy but we have not yet had time to complete all the studies. I think there will be at least something to add to the pathology of alymphatic leukemia.

Mr. President, I would ask that you call on Dr. Ikeda, who did the postmortem on this case.

DR. KANO IKEDA (St. Paul) (by invitation): The pathological picture about to be described is not anything unusual, but a typical picture of an acute case of lymphatic leukemia. It is not necessary for me to describe in detail the specimens. I have brought them for you to see. The one striking thing in the external appearance is the waxy pallor of the skin without any emaciation. There were many small petechial spots over the body.

On opening the thoracic cavity nothing unusual was found. The thymus was about 20 gms. in weight, an increase which is usual in this condition. The liver weighed about 1,000 gms., a few hundred grams larger than normal in a child of this age. It was pale orange yellow in color as shown here, and this color is practically the same as when it was autopsied. The spleen weighed 125 gms., or perhaps twice the normal weight. The capsule was dark red and tense, and the cut surface showed a very firm, red pulp. The corpuscles were indistinct. In the gastrointestinal tract, the stomach was very striking in appearance in that there were very many hemorrhagic spots over the mucous membrane. There was hyperplasia of the Peyer's patches in the terminal ileum. The kidneys weighed about 150 gms. (right) and 160 gms. (left) and showed a swollen, waxy parenchyma with areas of hemorrhages in the cortex, as seen in the specimen. There were also some petechial spots in the mucous membrane of the bladder. In a kidney of this kind you would think the function would be impaired. The urea nitrogen of the pericardial fluid showed about 20 mgms. per 100 c.c., which means that probably the function of these kidneys was not particularly impaired. No red cells were seen in the sediments of the urine obtained at autopsy. The lymph nodes, while not very large, were practically every one reddish in appearance with some hemorrhage, so that they are distinctly visualized all along the intestinal border of the mesentery and in the retroperitoneal groups. The bone marrow was hemorrhagic and showed rather solid marrow tissue. The smear made on this, and stained with Wright's stain, shows it to be practically entirely predominated by lymphoid cells. The striking picture found in these specimens is due to a terminal gush of hemorrhage which produced these hemorrhagic spots all over. (Several lantern slides of microscopic sections were shown.)

One thing I want to emphasize is the importance of a careful study of blood smears in cases of this kind, particularly when they happen to be children. This shows us a lesson. When a condition such as this occurs in practice, the ordinary blood counts alone would not be sufficient.

DR. E. T. F. RICHARDS (St. Paul): The case of the mother is interesting in connection with this child's illness. She gives a history of having been pale and anemic over a period of 12 years, although we could obtain no figures on the degree of anemia. Her age is now 37. She was said to have been particularly anemic at the time this child was born. She has never bled and there have been no other symptoms whatever except the weakness attendant on the anemia. She now shows marked pallor and a very large spleen. There is no generalized adenopathy. Her red cell count is below 3,000,000, Hb. below 40 per cent, with a leukopenia of 4,000, but nothing abnormal in the differential. She has a normal amount of free hydrochloric acid in the gastric contents.

As we do not know the cause of leukemia, one wonders if a particular type of bone marrow insufficiency may have been transmitted by the mother to the child. Then there is, in addition, the infant sister with a profound anemia.

It is a very remarkable coincidence at least, and there may be quite possibly some connection which our studies on leukemia so far have not made clear.

Dr. Walter Ramsey (St. Paul): It is interesting that in these children with leukemia one not infrequently finds a low leukocyte count, which often amounts to leukopenia. One can slip up on them if one is just looking for a leukocytosis. Dr. Stewart had a case of leukemia in the Children's Hospital which never had over 10,000. A high leukocyte count is not necessary in children.

Dr. H. L. Ulrich (Minneapolis) reported a thyroid case complicated with acute rheumatic fever. X-ray films were shown, and postmortem report given.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

TRANSACTIONS OF MINNEAPOLIS SURGICAL SOCIETY

Regular Monthly Meeting, Oct. 3, 1929

The meeting was called to order at 8 p. m. in the Hennepin County Medical Society lounge, with an attendance of twenty members and four guests.

The meeting was given over to a discussion of case reports and the presentation of papers.

Dr. Arthur F. Bratrud presented a case of extensive burns on a child twenty months old treated by the immediate application of 10 per cent tannic acid solution. The results in this case were unusually good. No infection had set in and the crust was dry and brown. The child was comfortable within half an hour after the application of the solution as wet packs and has had no pain at any time since.

Dr. Martin Nordland gave the following very interesting discussion of chorio-epithelioma, and showed microscopic slides of his two cases. His paper received a very general discussion by members present.

Chorio-epithelioma is a very malignant tumor, arising invariably in connection, either immediate or remote, with pregnancy. The subject is one of the most debatable chapters in pathology because of the great variation and the frequent lack of coördination between the clinical and pathological findings. In 1910, Ewing made a classification, according to the histology, dividing the tumors into the two main divisions: (1) Benign chorio-adenoma and (2) malignant chorio-carcinoma.

Geist, a later author, believes that there are so many transitional forms between Ewing's chorio-adenoma and chorio-carcinoma that it is impossible to differentiate accurately enough by histological means to be of any prognostic value. Geist's conception seems to be that of the majority of pathologists at the present time.

According to Dr. Bell, the microscopic picture must show invasion of the uterine wall by nests of Langhans cells surrounded by syncytial cells.

In summary, the disease is of fetal orign, therefore in fertile women and located usually in the uterus with a period of latency of a few weeks to several years. Metastasis occurs in nearly all cases through the blood stream, explained by a tendency of the fetal ectodermal cells to erode and penetrate the blood-vessels. The lungs are the most frequently attacked. The vagina and vulva are next in frequently, due to the venous network present. Symptoms are dependent upon whether a uterine tumor or metastasis exists. The most characteristic and prominent symptom of uterine tumor is hemorrhage. Intra-peritoneal hemorrhage (due to a perforated uterus) simulating ruptured tubal pregnancy, is rare. My second case, reported here, deals with such an onset.

There is no uniform treatment. Hysterectomy seems the most reasonable single form of treatment. Radium has not been used enough to warrant conclusions. Partial removal and curettements have cured the disease in some cases and were advocated by Ewing in young women. Prognosis as a whole is bad, recurrence within a year being the rule. There are cases recorded undergoing spontaneous cure.

The first case that I shall report will illustrate Ewing's chorio-adenoma and occurred in a woman thirty-five years of age, whose history is as follows:

Past and family history is essentially negative.

Menstruation began at fourteen years of age and was normal up to seven months before examination. Five normal pregnancies went to term. Miscarriage occurred in January, 1926, following scarlet fever.

The chief complaint had been irregularly recurring menstruation, lasting for periods of six weeks for the past seven months. She had never been quite free from bleeding during that time. She had severe backaches most of the time, felt tired and worn out. Three weeks before examination, the patient noticed a watery discharge with a peculiar pale, pink-colored secretion without odor, for a few days at a time, when the hemorrhage seemed to subside. Patient seemed quite nervous, had a good appetite and slept well. She had not lost in weight.

Physical examination revealed an extremely pale individual, with a dry tongue. Temperature was normal and blood pressure 116/94. Except for a systolic mitral murmur, general examination was entirely negative. Bimanual examination revealed a uniform, smooth painless mass, the size of a large orange, apparently a part of the fundus, filling the cul-de-sac and tilted to the left. It had a cystic feel. The mass was not fixed, could be moved in any direction, returned to the left adnexal region. There was a bloody vaginal discharge. Two weeks later, on re-examination, the physical findings were identical with the previous examination. Patient had a steady bleeding since the first examination. There was no evidence of pain

with the bleeding, such as might be expected with pregnancy.

A diagnosis of uterine myoma was made and hysterectomy recommended.

At operation, the uterus was found to be the size of a grapefruit, corresponding to the preoperative findings, with a dense attachment of the omentum to the left horn. A subtotal supra-vaginal hysterectomy was made.

The specimen proved to be a chorio-epithelioma, grossly and microscopically, the diagnosis being confirmed by Dr. E. T. Bell.

The second case is that illustrating Ewing's choriocarcinoma with an acute intraperitoneal hemorrhage from uterine rupture. The history is as follows:

A woman, twenty-five years of age, had a history essentially negative except for one pregnancy which went on to term August 3, 1926.

Chief complaint: Last normal period was May 15, 1928. She began to flow July 7, 1928, continued to flow moderately and severely by spells. She was curetted on July 25, 1928, leaving the hospital on July 27. She began to flow again on August 6, with a hemorrhage on the 8th. The patient continued to flow, became anemic, cachectic and extremely weak and on the 6th of September was again curetted. Following this procedure, the patient became much better, apparently regaining her former health, but the regularity of her menstruation was slightly interfered with. An occasional spotting was present. On April 28, nearly one year after the last normal period, the patient was suddenly seized with severe abdominal pain, beginning in the epigastrium and focusing in the right lower abdominal quadrant after about four hours. She had nausea and vomiting. The last regular period was two weeks before this attack of pain. About five hours after the onset, the abdomen was found rigid, with localized tenderness over McBurney's point. A tentative diagnosis of acute appendicitis or ectopic pregnancy was made. The patient was sent to the hospital, where the leukocyte count was 10,000, and a recount two hours later was 10,400. A third count was 9,600.

Bi-manual examination revealed a normal sized uterus in good position. There was some tenderness on examination and pain in the right adnexal region, but no mass was made out.

On opening the peritoneum, free blood was found, filling the interstices between the omentum and loops of the intestine. A snag of omentum was fastened to the top of the fundus of the uterus. The bladder was adherent to the rim of the fundus by recent adhesions and through the bladder fold could be seen an irregular mass, the size of a walnut, projecting on the anterior wall of the uterus. After the bladder was separated away bluntly with the finger, a spurting of bright red blood occurred. This mass was dark brown in color, and about the size of a walnut, projecting under the serosa of the anterior wall of the fundus. The serosa was broken in two places. On the posterior wall of the bladder was an ulcerated surface the size of a dime, with a necrotic base, from which blood was freely oozing. This corresponded to the attachment of the bladder over the mass.

A pan-hysterectomy was performed and the injured bladder repaired. The patient made an uncomplicated recovery.

A diagnosis of chorio-epithelioma was made at operation and confirmed by Dr. Smith and Dr. Bell.

According to Lynch, of the University of California, only nine cases with acute intraperitoneal hemorrhage have been reported.

Dr. Richard R. Cranmer presented the following report of an unusual case of ovarian pregnancy.

The patient is a married woman, aged 32, the mother of two children. No pregnancy has occurred since the birth of her second child five years ago. Menstruation began at the age of thirteen, lasted eight to ten days at twenty-eight day periods. There was no history of dysmenorrhea or pelvic infection.

She menstruated in February, 10 days, as usual, at which time she experienced severe cramp-like pains, especially on the left side. Previous to the menstruation she had had some pain of mild degree on the same side. One week after menstruation she experienced an increasing amount of pain, especially on lifting. She was seen at the office at this time and a mass the size of a lemon was felt to the left of the uterus. This mass was movable, but it gave her considerable pain on manipulation. The temperature was 100 degrees F. by mouth. The leukocyte count was 13,000, red cells 3,800,000, hemoglobin 80 per cent. A diagnosis of ovarian cyst was made and the impression was that it was probably twisted on its pedicle and possibly gangrenous, causing pain and peritoneal irritation, increased white cell count and fever. The possibility of ectopic pregnancy was considered because there seemed to be a slight uterine enlargement but was ruled out because the mass was freely movable and there was no history of a skipped menstruation. No nausea or breast signs had been noted. She was operated upon the following day. The mass was found to be the left ovary without adhesions to any structure. It was dark in color and about four or five times the normal size of an ovary. It was somewhat soft and was taken to be a hematoma of the ovary. It was removed and on opening it was found to contain a sac with clear fluid and what appeared to be placental tissue. A small grayish body was seen on a pedicle, which, I believe, was the fetus, but on looking for it later I could not find it. Dr. Graves sectioned and stained a piece of the tissue suspected of being placental tissue and reported it was placenta. A photomicrographic slide has been made which shows chorionic villi with their two layers, the syncytium and the layer of Langhans cells. The specimen itself was sent to Dr. George Streeter, Director of the Embryology Department of the Carnegie Institute. His report follows:

"I am enclosing photographs of your specimen which prove very conclusively that you have an ovarian pregnancy. In the photographs one can clearly recognize the corpus luteum, graafian follicles and typical ovarian

tissue, embedded in which is the ovum with normal appearing chorion and chorionic villi. The photograph of the gross slide laid open in the midline gives the appearance of the total chorionic sac occupying the central area of the ovary. Around the tips of the villi there is more or less extravasation typical of implantation areas."

DR. STANLEY R. MAXEINER showed two children, both aged six, operated upon for hypospadias by the Bucknall method. Both of these children, up to the time of their operations, had to sit down to urinate. In both instances, the urinary meatus is now at the frenum and both are able to void in the normal manner.

The meeting adjourned.

H. O. MCPHEETERS, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

PATHOLOGY OF SO-CALLED "ACUTE PYELITIS" IN INFANTS: James R. Wilson, M.D., and Oscar M. Schloss, M.D., New York (Amer. Jour. of Dis. of Children, August, 1929, Volume 38, Number 2). Fever and the presence of moderate or large amounts of pus in the urine of infants or young children usually lead to the diagnosis of pyelitis. The authors believe that the usual cause of so-called pyelitis is a true suppurative lesion of the interstitial tissue of the kidney itself.

The frequency with which "so-called pyelitis" follows other infections in the body is suggestive. It seems possible that bacteria may be transported directly to the kidney and excite there an acute inflammatory lesion such as is known to occur in septicemia. This relationship, however, is suggestive only and cannot be considered direct unless the same variety of microorganism is demonstrated as the cause of both lesions.

Postmortem examination showed clearly in their group of cases that pyuria was due to suppurative nephritis, but the clinical picture was indistinguishable from that of so-called "acute pyelitis." Despite the results of postmortem examination, it may perhaps be assumed that pyelitis is the primary disease, with secondary involvement of the kidney. Case 3 is given in illustration.

Case 3.—Marked pyuria in a boy, aged 4 months. Multiple abscesses in one kidney removed at operation. Subsequent enlargement of remaining kidney. Recovery. Left kidney removed and showed an acute suppurative nephritis and a large number of small abscesses. The clinical history of this patient is fairly typical of so-called "acute pyelitis." The persistence of the pyuria and general symptoms following operation, with enlargement of the remaining kidney, strongly suggests that the lesions in both kidneys were identical.

This case demonstrates spontaneous recovery from severe suppurative nephritis and supports similar observations by Forbes, Chown, Bugbee, and others.

The authors believe that the smaller foci which were found in the milder cases of so-called pyelitis are not incidental, but in all probability represent the pathologic lesions which give rise to pyuria.

It is their belief, however, based on the evidence set forth, that the most common cause of severe pyuria in young infants, especially the type of case usually designated pyelitis, is an acute inflammatory process of the interstitial tissue of the kidney.

R. N. ANDREWS, M.D.

TUBERCULOSIS IN INFANTS UNDER ONE YEAR OF AGE—A STUDY OF THE AUTOPSY AND THE CLINICAL OBSERVATIONS ON INFANTS WITH TUBERCULOUS LESIONS: Katharine Merritt, M.D., New York, New York (Amer. Jour. of Dis. of Children, September, 1929, Volume 38, Number 3). Over a period of thirteen years at the Harriet Lane Home for Invalid Children, autopsies were performed on seventy-five infants under 1 year of age who showed tuberculous lesions.

Ribadeau-Dumas expressed the opinion that a mother with lesions which are becoming progressively worse during gestation can transmit bacilli to the fetus through the placenta.

The views of Calmette and his school, that placental transmission is common, do not seem to be founded on good evidence and are probably incorrect.

In forty-seven tuberculous children under 1 year of age, Hedren found that the bronchial lymph glands were involved in 100 per cent. The lungs were involved in every patient except two. Cavities occurred in nearly 50 per cent of the cases. They occurred most frequently on the right side.

Pleural adhesions were present in nearly 50 per cent of the cases, occurring most frequently on the right side. The spleen was involved in nearly all cases, the principal lesion found being miliary tubercles. The liver, also, was involved in nearly all the cases. The kidneys showed tubercles in more than half of the total number of cases. One-third of the total number of cases in this series showed a definite ulceration of the intestines.

R. N. ANDREWS, M.D.

ROENTGENOLOGY

SUPERVISORS

LEO G. RIGLER

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A. U. DESJARDINS

MAYO CLINIC, ROCHESTER

RADIOLOGY OF THORAX: Samuel Brown (Radiology, 1929, XIII, 575). The purpose of this paper is to show the value of studying the thorax in three dimensions. Theoretically, stereoscopy should answer every purpose but this is not the case. Samuel Brown believes after many years of study using stereoscopic plates and supplementing them with a lateral plate that the value of stereoscopy has been over-rated with the exception of an early tuberculosis. But in the case of gross lesions of the cardiovascular and pulmonary system, the anterior-posterior and lateral views are much superior in locating abnormal shadows, determining their relation to surrounding structures and the interpretation of their probable nature.

It has been observed that there exists a constant relation between the size of the thorax and the size of the heart. This has led to the following formula: The transverse and anterior-posterior diameters of the thorax are determined, the measurements being taken at the level of the fourth rib anteriorly. The two measurements are multiplied and the product is divided by the sum of the two measurements. The quotient will be equal to the transverse diameter of the heart under normal conditions. If the actual transverse diameter of the heart, on a six foot plate, does not exceed the predetermined measurement, it will be evident that no hypertrophy or dilatation exists. If, however, the actual transverse diameter of the heart is found to exceed the predetermined measurement, there is strong evidence of the existence of cardiac enlargement.

In the *x*-ray anatomy of the lateral view of the thorax, a glance at the anterior and posterior boundaries shows the anterior costophrenic angle to be on a higher level than the posterior costophrenic angle. Therefore, if a slight amount of fluid is present in the pleural cavity, it is the posterior costophrenic angle that will be obliterated first. The diaphragm may be found to be elevated and partly obscure the heart shadow due to paralysis of the phrenic nerve or increased intra-abdominal pressure. The diaphragm may be pressed low as a result of emphysema, pneumothorax or pleurisy with effusion. Adhesions between the diaphragm and pleura and their exact locations may be determined.

Fine changes in the lung apices cannot be differentiated, but gross changes and their exact location can fully be determined.

The hilus is recognized by its irregular dense shadow below the arch of the aorta. The esophagus cannot be differentiated unless it has been rendered opaque.

In the lateral view, the middle lobe of the right lung overlaps the heart shadow. Tuberculous cavities or infiltrations of a lobe can be located with certainty. The absolute location of a lesion is especially important in diseases of the pleura, such as interlobar empyema and encapsulated empyema.

Thus it is seen that anterior-posterior and lateral views enable one to study the thoracic structures in their true perspective, because one is studying volumes rather than surfaces.

E. F. JOHNSON, M.D.